UNIVERSITY OF DELHI

RATAN TATA
LIBRARY

DELHI SCHOOL OF ECONOMICS

THE RATAN TATA LIBRARY

Cl. No. B28d Jo

Ac. No. 12936

Date of release for loan

This book should be returned on or before the date last stamped below. An overdue charge of twelve nP. will be levied for each day the book is kept beyond that date.

7 MAY 1959
19 FEB 1959
26 FEB 1960
16 MAY 1962
16 SEP 1964
21 SEP 1964
30 AUG [illegible]
28 DEC 1966
29 DEC 1966
31 DEC 1966
21 AUG 1969
28 NOV 1973
29 MAY 1974

COLLEGE OUTLINE SERIES

TABLES FOR STATISTICIANS

44

HERBERT ARKIN
College of the City of New York

AND

RAYMOND R. COLTON
College of the City of New York

New York

BARNES & NOBLE, INC.

COPYRIGHT, 1950
By BARNES & NOBLE, INC.
All rights reserved

Reprinted, 1953

L. C. Catalog Card Number: 50-3778

Printed in the United States of America

PREFACE

The most efficient and powerful statistical techniques are of little value unless application is possible within the resources of the statistical worker and, since statistical data are highly perishable in nature, unless the analysis can be accomplished in a minimum of time.

A major obstacle to the use of important techniques available to the statistician often is the cost and time involved in the calculations necessary to complete the analysis. Many of these calculations can be simplified by resort to tables in which the required values are supplied directly without computation. There are innumerable tables that are of value for such uses. This book contains a selection of the most frequently used tables. Many other tables of great value had to be excluded in order to keep the size and cost of one volume within the bounds of utility.

It is hoped that this collection of tables not only will facilitate the application of statistical methods but also will result in a more widespread usage of these powerful tools of analysis.

The authors wish to acknowledge their debt to the authors and publishers who have permitted the reproduction of their tables in this volume. In each case due credit has been given in an appropriate footnote on the first page of each table.

We are indebted to Professor Ronald A. Fisher, to Dr. Frank Yates, and to Messrs. Oliver & Boyd, Ltd., Edinburgh, for permission to reprint Table No. IV (reproduced in this book as Table 14) from their book *Statistical Tables for Biological, Agricultural, and Medical Research.*

HERBERT ARKIN
RAYMOND R. COLTON

CITY COLLEGE OF NEW YORK
NEW YORK CITY

CONTENTS

Instructions 1
The Greek Alphabet 25
Table 1. Table of Squares (100–1,000) 26
Table 2. Table of Square Roots (1,000–10,000) 28
Table 3. Table of Cubes and Cube Roots (1–1,000 Including N, $10N$, and $100N$) 68
Table 4. Table of Powers (1–100, 4th to 8th powers) 78
Table 5. Table of Common Logarithms of Numbers — Five Place 80
Table 6. Table of Natural or Naperian Logarithms (.01–11.09) . . 100
Table 7. Table of Reciprocals (100–999) 104
Table 8. Table of Factorials (1–15) 108
Table 9. Table of Logarithms of Factorials (1–1,000) 109
Table 10. Table of Areas of the Normal Curve 114
Table 11. Table of Ordinates of the Normal Curve 115
Table 12. Table of t 116
Table 13. Table of F 117
Table 14. Table of Chi Square 121
Table 15. Table of z for Values of r from .00 to 1.00 122
Table 16. Table of r for Values of z from 0 to 5 123
Table 17. Table of Poisson Distribution for Selected Values of $\bar{X}$. 124
Table 18. Table of 3σ Confidence Limits for Binomial Distribution in Per Cent for Sample Sizes 100 to 100,000 and p of .1% to 40% 134
Table 19. Table of Sample Size Required for Finite Populations, for Confidence Limits and Specified Reliability Limits in Sampling Attributes in Per Cent 136
Table 20. Table of Functions of r 138
Table 21. Table of 5% and 1% Points for r and R 140

Table 22. Table of Probability of Occurrence of Statistical Deviations of Different Magnitudes Relative to the Standard Error 141
Table 23. Table of Random Numbers 142
Table 24. Table of Natural Trigonometric Functions 146
Table 25. Table of Important Constants 152

INSTRUCTIONS

Table 1. Table of Squares, 100–1,000

(Pages 26–27)

The square of a number may be secured by locating the first two digits of the number in the appropriate row of the first column and the third digit at the top of the appropriate column. The square may be read directly from the body of the table.

For example, the square of 456 is obtained by finding the row for 450 and the column for 6. The square of 456 is found in the body of the table to be 207,936.

When decimals are involved in the selected value, the decimal point is moved *two* places in the square for each place in the original number. For instance:

N	N^2
456.	207,936.
45.6	2,079.36
4.56	20.7936
4,560.	20,793,600.

	N^2 0	N^2 1	N^2 2	N^2 3	N^2 4	N^2 5	N^2 6	N^2 7	N^2 8	N^2 9
450	202500	203401	204304	205209	206116	207025	207936	208849	209764	210681
460	211600	212521	213444	214369	215296	216225	217156	218089	219024	219961
470	220900	221841	222784	223729	224676	225625	226576	227529	228484	229441
480	230400	231361	232324	233289	234256	235225	236196	237169	238144	239121
490	240100	241081	242064	243049	244036	245025	246016	247009	248004	249001

Table 2. Table of Square Roots, 1,000–10,000

(Pages 28–67)

The square root of N may be obtained directly by locating the first three digits of the number in the appropriate row of the first column and the fourth digit at the top of the appropriate column. The square root of N may be read directly from the body of the table by adding the prefix at the top of the column to the figure in the body of the table. When an asterisk (*) appears after a figure in the column, the prefix indicated at the *bottom* of the column is used from that point on.

For example, the square root of 2,374 is found by using row 2,370 and column 4 (p. 34). The answer is read as 40 + (the prefix at the head of the column) 8.7237, or 48.7237. The square root of 10 times 2,374, or 23,740, is obtained from the portion of the column headed $\sqrt{10N}$ and is 100 + 54.0779, or 154.0779.

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	40+	100+	40+	100+	40+	100+	40+	100+	40+	100+
2350	8.4768	53.2971	8.4871	53.3297	8.4974	53.3623	8.5077	53.3949	8.5180	53.4275
2360	8.5798	53.6229	8.5901	53.6555	8.6004	53.6880	8.6107	53.7205	8.6210	53.7530
2370	8.6826	53.9480	8.6929	53.9805	8.7032	54.0130	8.7134	54.0454	8.7237	54.0779
2380	8.7852	54.2725	8.7955	54.3049	8.8057	54.3373	8.8160	54.3697	8.8262	54.4021
2390	8.8876	54.5962	8.8979	54.6286	8.9081	54.6609	8.9183	54.6932	8.9285	54.7256

When the number for which the square root is desired involves decimals, the square root may be obtained by pairing off the numbers to the left and right of the decimal point, as in the manual computation of square roots, and using N or $10N$ as indicated by the first pair. The appropriate column is readily indicated by the approximate square root of this first pair. The decimal is adjusted appropriately in the answer as determined from the table. For example, for the following values of N, the square root is secured as follows (see p. 42):

N	Paired N	First Pair	Use	Square Root
429.3	04 29.30	04	$\sqrt{10N}$	20.71956
42.93	42.93	42	$\sqrt{N}$	6.55210
4.293	04.29 30	04	$\sqrt{10N}$	2.071956
.4293	.42 93	42	$\sqrt{N}$	.655210
.04293	.04 29 30	04	$\sqrt{10N}$	.2071956

The following relationships are of value in using this table:

$$
\begin{aligned}
\sqrt{100N} &= 10\sqrt{N} \\
\sqrt{1000N} &= 10\sqrt{10N} \\
\sqrt{\tfrac{1}{10}N} &= \tfrac{1}{10}\sqrt{10N} \\
\sqrt{\tfrac{1}{100}N} &= \tfrac{1}{10}\sqrt{N} \\
\sqrt{\tfrac{1}{1000}N} &= \tfrac{1}{100}\sqrt{10N}
\end{aligned}
$$

Table 3. Table of Cubes and Cube Roots, 1–1,000, Including *N*, 10*N*, and 100*N*

(Pages 68–77)

The cubes of the numbers between 1 and 1,000 may be read directly from the table. Thus the cube of 195 (see p. 69) is found to be 7,414,875. When the number for which the cube is desired includes a decimal point, the answer may be determined by shifting the decimal point *three* places in the answer for each place it is shifted in the original figure. For example (see p. 70):

N	N^3
247.	15,069,223.
24.7	15,069.223
2,470.	15,069,223,000.

The cube root of N may be secured directly by locating the appropriate row for N and reading the figure in the body of the table. For example (see p. 74):

N	$\sqrt[3]{N}$	
615	8.504035	Using $\sqrt[3]{N}$ column
6,150	18.32139	Using $\sqrt[3]{10N}$ column
61,500	39.47223	Using $\sqrt[3]{100N}$ column

n	n^3	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
615	232 608 375	8.504 035	18.32139	39 47223
616	233 744 896	8 508 642	18 33131	39.49362
617	234 885 113	8.513 243	18.34123	39.51498
618	236 029 032	8.517 840	18 35113	39.53631
619	237 176 659	8.522 432	18.36102	39.55763

If a decimal point is included in the number for which the cube root is desired, the number is separated into triads to the left and right of the decimal. The appropriate column for use ($\sqrt[3]{N}$, $\sqrt[3]{10N}$, or $\sqrt[3]{100N}$) is selected as indicated by the approximate cube root of the first triad and the decimal point shifted appropriately. The following table is useful in selecting the appropriate column:

First Triad	First Figure of Cube Root
000–007	1
008–026	2
027–063	3
064–124	4
125–215	5
216–342	6
343–511	7
512–728	8
729–999	9

For example:

N	Triads	First Triad	Use	Cube Root
825.	825.	825	$\sqrt[3]{N}$	9.378887
82.5	082.500	082	$\sqrt[3]{100N}$	4.353294
8.25	008.250	008	$\sqrt[3]{10N}$	2.020620
.825	.825	825	$\sqrt[3]{N}$	.9378887

The following relationships are of value in using this table:

$$\begin{aligned}
\sqrt[3]{1{,}000N} &= 10\sqrt[3]{N}\\
\sqrt[3]{10{,}000N} &= 10\sqrt[3]{10N}\\
\sqrt[3]{100{,}000N} &= 10\sqrt[3]{100N}\\
\sqrt[3]{\tfrac{1}{10}N} &= \tfrac{1}{10}\sqrt[3]{100N}\\
\sqrt[3]{\tfrac{1}{100}N} &= \tfrac{1}{10}\sqrt[3]{10N}\\
\sqrt[3]{\tfrac{1}{1000}N} &= \tfrac{1}{10}\sqrt[3]{N}
\end{aligned}$$

Table 4. Table of Powers, 1–100, 4th to 8th Powers

(Pages 78–79)

Statistical calculations frequently involve the use of the higher powers of numbers. The fourth to eighth powers of the numbers from 1 to 100 may be secured directly from the Table of Powers. This table supplements the tables of squares and cubes.

All powers are expressed to at least seven significant figures. For the larger numbers, a heading in terms of 10 to a given power is shown for each group. The result may be written in final form by shifting the decimal point to the right by the number of places indicated in the exponent of 10. For example, the approximate value of 35^6 is shown as 18.382656×10^8 which may be written as 1,838,265,600.

n	n^4	n^5	n^6	n^7	n^8
			$\times 10^8$	$\times 10^{10}$	$\times 10^{11}$
30	810000	24300000	7.290000	2.187000	6.561000
31	923521	28629151	8.875037	2.751261	8.528910
32	1048576	33554432	10.737418	3.435974	10.995116
33	1185921	39135393	12.914680	4.261844	14.064086
34	1336336	45435424	15.448044	5.252335	17.857939
35	1500625	52521875	18.382656	6.433930	22.518754
36	1679616	60466176	21.767823	7.836416	28.211099
37	1874161	69343957	25.657264	9.493188	35.124795
38	2085136	79235168	30.109364	11.441558	43.477921
39	2313441	90224199	35.187438	13.723101	53.520093

Table 5. Table of Common Logarithms–Five Place

(Pages 80–99)

To Determine a Logarithm. The logarithm of a number is the exponent of the power to which another number, the base (in this case 10), must be raised in order to equal the original number. For instance, 100 is equal to 10^2, and the logarithm of 100 thus is 2.

Since most numbers are not expressable as even powers of 10, the logarithm of such a number is indicated as an integer and an endless decimal value. The integer is called the characteristic and the decimal is referred to as the mantissa. Mantissas are indicated to five decimal places in these tables. For instance, the logarithm of 121 is 2.08279, or a characteristic of 2 and a mantissa of .08279.

N	L 0	1	2	3	4	5	6	7	8	9
117	819	856	893	930	967	*004	*041	*078	*115̄	*151
118	07 188	225̄	262	298	335	372	408	445	482	518
119	555̄	591	628	664	700	737	773	809	846	882
120	918	954	990	*027	*063	*099	*135̄	*171	*207	*243
121	08 279	314	350	386	422	458	493	529	565̄	600
122	636	672	707	743	778	814	849	884	920	955
123	991	*026	*061	*096	*132	*167	*202	*237	*272	*307
124	09 342	377	412	447	482	517	552	587	621	656

The same mantissa is used for all numbers involving the same figures regardless of the existence or position of a decimal point in the original number. The characteristic indicates the position of the decimal point; it represents the number of places the decimal is shifted from its position after the first figure of the number. For example:

Number	Characteristic	Mantissa	Complete Logarithm
2.	0	.30103	.30103
20.	1	.30103	1.30103
200.	2	.30103	2.30103
2,000.	3	.30103	3.30103
.2	−1	.30103	−1.30103 or $\bar{1}.30103$ or 9.30103−10
.02	−2	.30103	−2.30103 or $\bar{2}.30103$ or 8.30103−10
.002	−3	.30103	−3.30103 or $\bar{3}.30103$ or 7.30103−10

The characteristic may be determined readily by counting the number of digits to the left of the decimal point and subtracting one. Where there are no digits to the left of the decimal point, merely count the number of positions to the right of the decimal to the first figure *other than zero* and record the resulting characteristic as a negative figure.

The logarithm of a number consisting of four or fewer figures may be secured by locating the row appropriate to the first three digits of the number and the column for the last of the four digits. Where the number consists of fewer than four digits, the number may be considered as though it were followed by sufficient zeros to comprise the requisite four digits. The mantissa is read from the table and prefixed with the appropriate characteristic as explained above.

The logarithm of 36.24 may be obtained as an illustration. The use of row 362 and column 4 reveals a mantissa of .55919. The characteristic is determined to be 1 since there are two numbers to the left of the decimal. The complete logarithm of 36.24 may be read as 1.55919.

It is to be noted that the first two digits of the mantissa in this table are indicated only for groups of mantissas to save space. Where an asterisk (*) appears, the first two digits of the next group of mantissas, located in the row below, are to be used for the mantissa.

Interpolation. Where the number for which the logarithm is to be secured exceeds four digits, its logarithm may be determined by interpolation in the table. When the differences are small it is assumed that the differences between the numbers are proportional to those between their logarithms.

The logarithm for the first four digits of the number is determined as well as that for the next higher four-digit number. A proportion of the difference between these two logarithms is secured by multiplying the difference by a fraction representing the proportion of the difference between the lower four-digit number (with enough zeros added to create the same number of digits as the original number) and the original number itself. This is added to the logarithm of the lower four-digit number.

For instance, the logarithm of 41.315 is desired. Using the method outlined above, the logarithm of 41.31 is found to be 1.61606. The logarithm of the next higher four-digit number, 41.32, is determined to be 1.61616. The difference between these two logarithms (1.61616 − 1.61606) is .00010. The proportion of this difference to be used is the difference between 41.31 and 41.315 or .005 divided by .010. The resulting proportion is .5. The difference between the logarithms (.00010) is multiplied by this proportion (.5) resulting in .00005. The value .00005 is added to the lower logarithm (1.61606) to give 1.61611 as the logarithm of 41.315.

The logarithm of a six-digit number may be found by interpolation. For larger numbers, tables of logarithms with more than five places may be used.

Interpolation Using Proportional Parts. To facilitate the determination of logarithms for numbers involving more than four digits, proportional parts (in the column headed PP) are given. These proportional parts are tenths of the tabular differences, which may be used to replace the computation given above. The tabular difference (difference between successive logarithms) heads the group of proportional parts. The figure in the left column of each group may be used to represent the fifth digit of the number for which the logarithm is to be secured. The column to the right contains the computed difference to be added to the logarithm of the next lower four-digit number.

In the example above (the logarithm of 41.315) the difference between the logarithm of 41.31 and 41.32 was determined to be .00010 or 10 as indicated in the proportional parts table. Using this tabular difference, the appropriate section of the PP table (that headed 10) is located. Since the fifth digit of the number is 5, 5 is located in the left-hand column. The associated difference

5.0 (or .00005) is then added to the lower logarithm to secure 1.61611.

Computation Using Logarithms. The use of logarithms is based on the following properties of logarithms.

I. The logarithm of a product of two or more numbers is equal to the sum of the logarithms of the numbers — *To multiply add logs:*

$$\text{Log } ABCD = \text{Log } A + \text{Log } B + \text{Log } C + \text{Log } D.$$

II. The logarithm of a quotient is equal to the logarithm of the dividend minus the logarithm of the divisor — *To divide subtract logs:*

$$\text{Log } \frac{A}{B} = \text{Log } A - \text{Log } B.$$

III. The logarithm of the nth power of a number is equal to n times the logarithm of the number:

$$\text{Log } A^n = n \text{ Log } A.$$

IV. The logarithm of the nth root of a number is equal to the logarithm of the number divided by n:

$$\text{Log } \sqrt[n]{A} = \frac{\text{Log } A}{n}.$$

To illustrate, compute:

$$\sqrt[3]{(\tfrac{125}{61})(4^3)}$$

To obtain $\frac{125}{61}$

$$\begin{array}{rcl} \log 125 & = & 2.09691 \\ \log 61 & = & \underline{1.78533} \\ \text{Subtracting, } \log \frac{125}{61} & = & .31158 \end{array}$$

To obtain (4^3)

$$\begin{array}{rcl} \log 4 & = & .60206 \\ & & \underline{\times 3} \\ \text{Multiplying by 3, } \log (4^3) & = & 1.80618 \end{array}$$

To obtain $(\frac{125}{61})(4^3)$

$$\begin{array}{rcl} \log \frac{125}{61} & = & .31158 \\ \log (4^3) & = & \underline{1.80618} \\ \text{Adding, } \log (\frac{125}{61})(4^3) & = & 2.11776 \end{array}$$

To obtain $\sqrt[3]{(\frac{125}{61})(4^3)}$

$$\begin{array}{rcl} \log (\frac{125}{61})(4^3) & = & 2.11776 \\ & & \underline{\div 3} \\ \text{Dividing by 3, log of answer} & = & 0.70592 \end{array}$$

The number corresponding to the logarithm (the antilogarithm) is then located. The antilog of the above logarithm is 5.081. The method for determining the number is as follows:

Antilogarithms. The antilogarithm of a logarithm is the number to which it corresponds. In most logarithmic work, it is necessary to convert the logarithm obtained back to a number when the computations are completed. To obtain the antilogarithm the table is used in reverse. However, the first two pages of the table (0–100) should not be used for this purpose, since they do not provide sufficient detail for interpolation.

In outlining the nature of a logarithm, we observed that the characteristic is used to locate the decimal point and that the mantissa is determined by the digits comprising the number. The mantissa of the logarithm for which the antilogarithm is desired is located as nearly as possible in the body of the table. The number corresponding to the given mantissa is read off, if the mantissa is located exactly. The appropriate decimal point is located as indicated by the characteristic. (See p. 5.)

To illustrate, determine the antilogarithm of 2.35083. The mantissa (.35083) is located in the body of the table and is found to correspond to the digits 2,243. The characteristic (2) then locates the decimal point, and the answer is 224.3.

When the mantissa cannot be located exactly in the table, interpolation may be used to locate the antilogarithm. For example, find the antilogarithm of $\bar{2}.49617$, or $8.49617 - 10$. The mantissa is .49617. The nearest *lower* value is located in the table as .49610 and is found to correspond to the digits 3,134. The next higher mantissa is found to be .49624 and corresponds to 3,135. The difference between the two mantissas is .00014. The required mantissa is .00007 above the first value and therefore is .00007 divided by .00014 of the distance between 3,134 and 3,135, or 31,345. The decimal point is now located in accordance with the rule on p. 5, and the result is .031345.

Logarithmic Computations Involving Numbers Less than One. Numbers less than one will have logarithms with negative characteristics. These logarithms may be written for computational purposes as follows: $8.30103 - 10$ rather than $\bar{2}.30103$ (for the logarithm of .02). Both the symbol $\bar{2}$ and the symbol $8 \ldots - 10$ indicate a negative characteristic of 2; the value of the mantissa, of course, remains unchanged for any characteristic. The illustration outlined below indicates the method of handling such logarithms.

Multiply .02 by .15

$$\begin{aligned} \log .02 &= 8.30103 - 10 \\ \log .15 &= \underline{9.17609 - 10} \\ \text{Adding, } \log[(.02)(.15)] &= 17.47712 - 20 = \bar{3}.47712 \\ \text{antilog} &= .0030 \end{aligned}$$

Table 6. Table of Natural or Naperian Logarithms, .01–1109

(Pages 100–103)

A number of statistical methods require the use of *natural* logarithms rather than the *common* or *Briggsian* logarithms given in Table 5. Natural logarithms (sometimes called Naperian or hyperbolic logarithms) use the base e (2.718 . . .) rather than the base 10 used in common logarithms. Since the characteristic of natural logarithms cannot be readily determined by inspection they are somewhat more difficult to use. The characteristic of the logarithm together with its mantissa is shown directly in the table. Natural logarithms may be manipulated in the same manner as common logarithms.

Section A of the table gives the natural logarithms for the numbers from 0.01 to 0.99, Section B for the numbers from 1.00 to 10.09, Section C for the numbers from 10 to 99, and Section D for the numbers from 100 to 1109. To locate a logarithm in any of the tables select the column for the last digit and the row for the preceding digits. Interpolation may be used to secure the natural logarithm for numbers with an additional decimal place beyond those given in the table.

A 0.00–0.99
-10 should be appended to each logarithm

N	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0		5.395	6.088	6.493	6.781	7.004	7.187	7.341	7.474	7.592
0.1	7.697	7.793	7.880	7.960	8.034	8.103	8.167	8.228	8.285	8.339
0.2	8.391	8.439	8.486	8.530	8.573	8.614	8.653	8.691	8.727	8.762
0.3	8.796	8.829	8.861	8.891	8.921	8.950	8.978	9.006	9.032	9.058
0.4	9.084	9.108	9.132	9.156	9.179	9.201	9.223	9.245	9.266	9.287

The natural logarithms may be secured for numbers beyond the range of the tables by use of the relationships:

$$\begin{aligned}\log_e (10N) &= \log_e N + \log_e 10\\ \log_e (100N) &= \log_e N + \log_e 100\\ \log_e (1{,}000N) &= \log_e N + \log_e 1{,}000\\ &\text{etc.}\end{aligned}$$

$$\begin{aligned}\log_e (\tfrac{1}{10}N) &= \log_e N - \log_e 10\\ \log_e (\tfrac{1}{100}N) &= \log_e N - \log_e 100\\ \log_e (\tfrac{1}{1000}N) &= \log_e N - \log_e 1{,}000\\ &\text{etc.}\end{aligned}$$

As an aid in these calculations the following values are given:

N	$\log_e N$
10	2.302585
100	4.605170
1,000	6.907755
10,000	9.210340

Common logarithms may be converted to natural logarithms by multiplying the common logarithm by 2.3025850930. Multiplication by 0.4342944819 converts natural logarithms to common logarithms.

Table 7. Table of Reciprocals, 100–999

(Pages 104–107)

The reciprocal of a number is that number divided into one.

$$\text{Reciprocal of } N = \frac{1}{N}.$$

When accomplishing the division of a series of numbers by a constant divisor, as in computing percentages or ratios, considerable time and effort can be saved by multiplying each of the values to be divided by the reciprocal of the constant divisor, since:

$$\frac{X}{N} = \frac{1}{N}X.$$

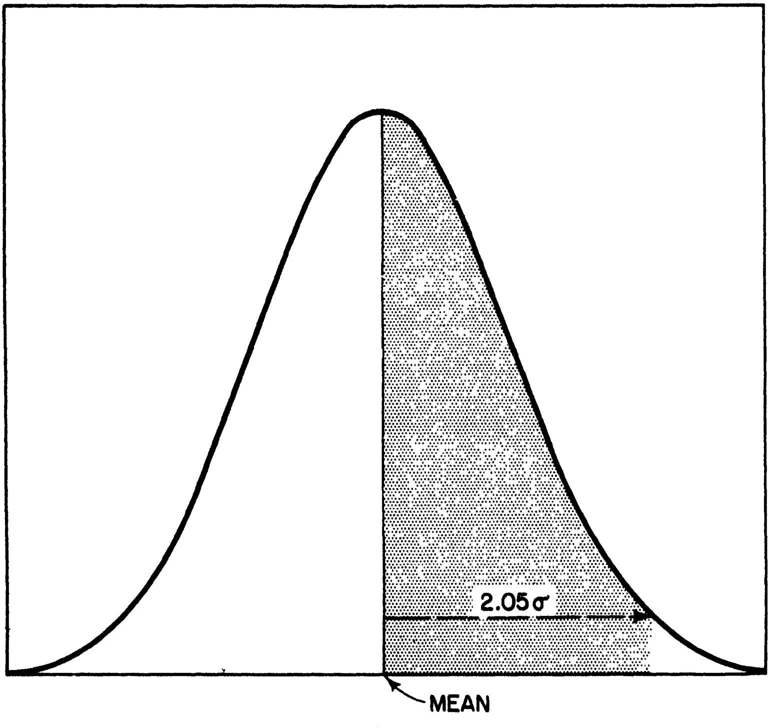

Fig. 1 (*See* p. 12.)

The reciprocal of the numbers from 100 to 999 can be read directly from the table by finding the row for the first two digits and the column for the last. However, the reciprocal of any number of not more than three digits can be obtained by locating the column and row for the given digits and shifting the decimal point as required. The decimal point is shifted one place in the reciprocal for each place it is moved in the number from its position after the third digit *but in the opposite direction.*

For example:

N	Reciprocal $\frac{1}{N}$
252.	.00396825
25.2	.0396825
2.52	.396825
.252	3.96825
2,520.	.000396825

If the reciprocal is locked on the keyboard of a calculating machine and the values to be divided are multiplied successively by this reciprocal, the quotients will be obtained with speed and facility.

Table 8. Table of Factorials, 1–15

(Page 108)

The increasing practical application of probability theory, especially in the field of quality control, has resulted in more frequent use of factorial N (written as $N!$ or $\underline{|N}$). Factorial N is the product of the first N successive natural integers. For instance, factorial 5 is equal to $1 \times 2 \times 3 \times 4 \times 5$.

Since these products become large their computation is arduous. The values of factorial N from 1 to 15 are listed in Table 8.

Table 9. Table of Logarithms of Factorials, 1–1,000

(Pages 109–113)

From the preceding table it is seen that the value of factorial N mounts rapidly and for values beyond 15! cannot be tabulated readily. However, the logarithms of factorials represent a convenient form in which to express and manipulate these values. A table of the logarithms of factorials for all values of $N!$ from 1 to 1,000 is included as Table 9.

The logarithm of the required factorial is secured by using the appropriate row and reading the entry in the body of the table.

Table 10. Table of Areas of the Normal Curve

(Page 114)

The percentage of the area under the normal curve between a perpendicular erected at the arithmetic mean and a perpendicular erected at any point to the left or right of the mean may be determined from this table. The distance between the arithmetic mean and the selected point is expressed in terms of standard deviations as $\frac{x}{\sigma}$, where x is the distance between the arithmetic mean and the selected point expressed in the original units of measurement, and σ is the standard deviation. Thus the percentage of the area between the arithmetic mean and a distance of 2.05σ to the right of the arithmetic mean is found from the table to be 47.98% of the total area under the curve. This is shown graphically in Figure 1 (p. 10).

It is to be emphasized that the entry in this table indicates the percentage of the area falling on *one* side of the arithmetic mean only. To find the percentage on *both* sides of the arithmetic

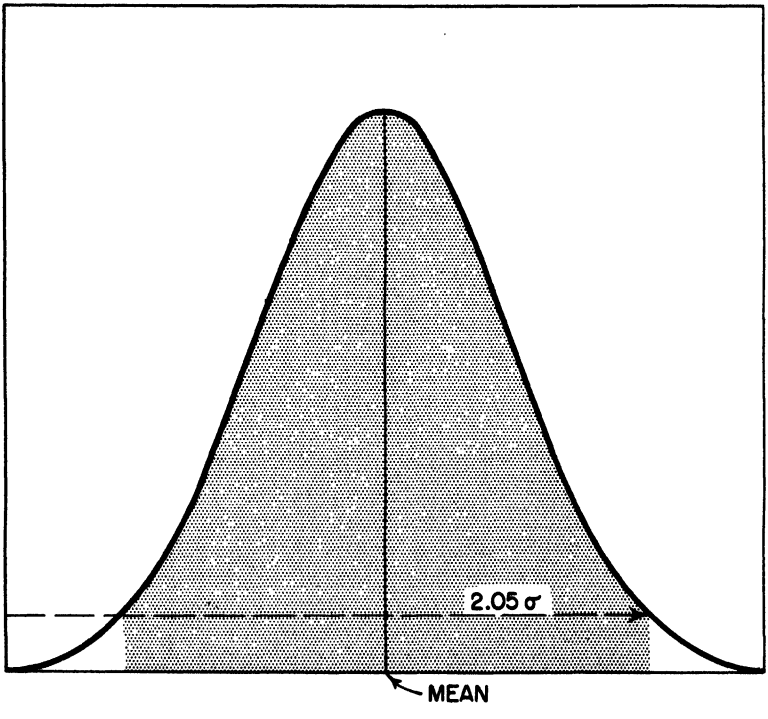

FIG. 2

mean, this percentage would be doubled. For the percentage of the area included within a distance of 2.05 standard deviations on both sides of the arithmetic mean, the figure of 47.98% previously obtained is doubled to secure 95.96% of the area. See Figure 2.

Table 11. Table of Ordinates of the Normal Curve

(Page 115)

This table indicates the height of an ordinate of the normal curve at any given distance from the arithmetic mean expressed as a percentage of the maximum ordinate. As in the normal curve area table, Table 10, the distance from the arithmetic mean is expressed in terms of standard deviations $\left(\frac{x}{\sigma}\right)$.

In order to determine the theoretical normal curve frequency at any given point $\frac{x}{\sigma}$ away from the arithmetic mean, the value in the table corresponding to the given $\frac{x}{\sigma}$ must be multiplied by the frequency for the maximum ordinate. This maximum ordinate frequency may be determined from

$$Y_0 = \frac{N}{2.506628\sigma'}$$

where σ' is expressed in terms of class intervals.
This may be written as:

$$Y_0 = .39894 \frac{NC}{\sigma}$$

where

C = size of class interval,
σ = standard deviation in original units.

Table 12. Table of *t*

(Page 116)

Used in conjunction with problems in the theory of sampling, the table of the *t* distribution[1] permits the evaluation of deviations expressed in terms of standard errors for samples of various sizes. A given standard error is divided into a difference or deviation, to obtain *t* as a basis for a test of significance. The table is entered with the number of degrees of freedom determined for the problem. The tabular entry in the column is the value of *t* associated with the probability level indicated at the top of the column. This level expresses the probability of obtaining a difference as large as the one obtained due to chance.

---

[1] Also known as Student's distribution.

Degrees of Freedom	Probability				
	0.50	0.10	0.05	0.02	0.01
1	1.000	6.34	12.71	31.82	63.66
2	0.816	2.92	4.30	6.96	9.92
3	.765	2.35	3.18	4.54	5.84
4	.741	2.13	2.78	3.75	4.60
5	.727	2.02	2.57	3.36	4.03
6	.718	1.94	2.45	3.14	3.71
7	.711	1.90	2.36	3.00	3.50
8	.706	1.86	2.31	2.90	3.36
9	.703	1.83	2.26	2.82	3.25
10	.700	1.81	2.23	2.76	3.17
11	.697	1.80	2.20	2.72	3.11
12	.695	1.78	2.18	2.68	3.06
13	.694	1.77	2.16	2.65	3.01
14	.692	1.76	2.14	2.62	2.98
15	.691	1.75	2.13	2.60	2.95

As an illustration, assume a test for the significance of the difference between two means. The actual difference is 12, but the standard error of the difference is computed to be 3. Assume that the degrees of freedom are determined to be 14 for the problem. Since the actual difference (12) divided by the standard error of the difference (3) results in a *t* value of 4, this may be compared to the *t* values listed in the table for 14 degrees of freedom. Since the *t* value for the .05 probability level is 2.14 and for the .01 level is 2.98, it is evident that there is less than 1 chance in 100 that the actual difference between the two means might have arisen due to chance. It is to be noted that this table indicates the probability of a value of *t* that deviates either positively or negatively from zero as far as the calculated value due to chance. In this case the *t* gives the probability that the first mean will exceed the second, or the second exceed the first, due to chance.

The probabilities for one direction only may be obtained by dividing the tabulated probability values by 2.

Table 13. Table of *F*

(Pages 117–120)

The technique of the analysis of variance requires the comparison of two variances and a test for the significance of the difference between the calculated variances. In this method the larger variance is divided by the smaller variance and the resulting ratio is referred to as the *F* ratio or merely *F*. The distribution of *F* is tabulated in Table 13 for the 5% and 1% fiducial levels. The 5% level value of *F* is indicated in ordinary type, and the 1% level figures are printed in bold face type.

												n_1 degrees of freedom (for greater mean square)				
	1	2	3	4	5	6	7	8	9	10	11	12	14	16	20	24
1	161 **4,052**	200 **4,999**	216 **5,403**	225 **5,625**	230 **5,764**	234 **5,859**	237 **5,928**	239 **5,981**	241 **6,022**	242 **6,056**	243 **6,082**	244 **6,106**	245 **6,142**	246 **6,169**	248 **6,208**	249 **6,234**
2	18.51 **98.49**	19.00 **99.00**	19.16 **99.17**	19.25 **99.25**	19.30 **99.30**	19.33 **99.33**	19.36 **99.34**	19.37 **99.36**	19.38 **99.38**	19.39 **99.40**	19.40 **99.41**	19.41 **99.42**	19.42 **99.43**	19.43 **99.44**	19.44 **99.45**	19.45 **99.46**

Entry into the table is accomplished by reference to the appropriate column for the degrees of freedom associated with the greater variance (greater mean square), and to the appropriate row for the degrees of freedom associated with the smaller variance. If the calculated ratio between the two variances (*F*) exceeds the value for *F* indicated in the body of the table for the 5% level, there are fewer than 5 chances in 100 that the disparity between the calculated variances is due to chance; if *F* exceeds that recorded for the 1% level, the probability is less than 1 in 100 that the difference is accidental.

Table 14. Table of Chi Square

(Page 121)

The chi square test is widely used in testing for goodness of fit and in testing the validity of hypotheses. In each instance, the test is accomplished by comparing the observed data, expressed as frequencies in various categories or groups, with the theoretical or expected results in the same categories or groups. The value of chi square is computed, based on the differences between the observed and theoretical frequencies, as follows:

$$\chi^2 = \sum \left[\frac{(f_0 - f)^2}{f} \right]$$

where

f_0 = observed or actual frequencies,
f = theoretical or expected frequencies.

The value of the computed chi square may be interpreted by reference to this table. The table is entered with the degrees of freedom appropriate to the problem. The row for the specified degrees of freedom is followed across the columns until a value of chi square in the body of the table is encountered which exceeds the value of the computed chi square. The heading of that column and the one to the left indicates the probability range.

There is a smaller probability than that shown in the column heading to the left that the differences between the actual and theoretical values for the stated chi square could have arisen due to chance or by sampling variation, or that a chi square as large as that indicated would arise due to chance. A low value for the probability figure indicates a small probability that the differences are accidental or arise through sampling variation. A large probability value indicates that differences as large as those found could have arisen due to chance or sampling variation.

Probability

n	·99	·98	·95	·90	·80	·70	·50	·30	·20	·10	·05	·02	·01	·001
1	·0^{3}157	·0^{3}628	·00393	·0158	·0642	·148	·455	1·074	1·642	2·706	3·841	5·412	6·635	10·827
2	·0201	·0404	·103	·211	·446	·713	1·386	2·408	3·219	4·605	5·991	7·824	9·210	13·815
3	·115	·185	·352	·584	1·005	1·424	2·366	3·665	4·642	6·251	7·815	9·837	11·345	16·268
4	·297	·429	·711	1·064	1·649	2·195	3·357	4·878	5·989	7·779	9·488	11·668	13·277	18·465
5	·554	·752	1·145	1·610	2·343	3·000	4·351	6·064	7·289	9·236	11·070	13·388	15·086	20·517

For example, if the computed value of chi square for a specified problem is found to be 17.0 where 5 degrees of freedom are associated with the data, the probability figure falls between .01 and .001 as seen in Table 14. This may be interpreted as an indication that there is less than 1 chance in 100 that the disparity between the observed frequencies and the theoretical frequencies found in this problem could have arisen solely due to chance.

When a given fiducial level is accepted, for example .01, and the probability associated with the computed chi square is a lower figure, the interpretation is generally that the differences are significant and that the hypothesis or null hypothesis used to establish the theoretical frequencies is false.

Table 15. Table of *z* for Values of *r* from .00 to 1.00

(Page 122)

Since the sampling distribution of the coefficient of correlation is non-normal unless the sample is large and the value of *r* is moderate or small, the standard error of the coefficient of correlation is not considered a valid measure for use in testing the significance or reliability of that measure.

However, *r* can be transformed to another value, the sampling distribution of which is normal even for small samples and when the population value of *r* is large. This transformation value is

$$z = \tfrac{1}{2}[\log_e(1 + r) - \log_e(1 - r)]$$

where $\log_e$ is the natural or Naperian logarithm (see Table 6), or in terms of common logarithms

$$z = 1.1513 \log_{10}\left(\frac{1 + r}{1 - r}\right)$$

The standard error of z is

$$\sigma_z = \frac{1}{\sqrt{N - 3}}$$

However, it is not necessary to calculate the value of z for a given value of r since its value can be obtained directly from this table. The value of z is indicated in the body of the table for the value of r indicated in the first column and the column captions.

TABLE A. r FROM ZERO TO 0.89 BY HUNDREDTHS

r	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.0000	.0100	.0200	.0300	.0400	.0500	.0601	.0701	.0802	.0902
.1	.1003	.1104	.1206	.1307	.1409	.1511	.1614	.1717	.1820	.1923
.2	.2027	.2132	.2237	.2342	.2448	.2554	.2661	.2769	.2877	.2986
.3	.3095	.3205	.3316	.3428	.3541	.3654	.3769	.3884	.4001	.4118
.4	.4236	.4356	.4477	.4599	.4722	.4847	.4973	.5101	.5230	.5361
.5	.5493	.5627	.5763	.5901	.6042	.6184	.6328	.6475	.6625	.6777
.6	.6931	.7089	.7250	.7414	.7582	.7753	.7928	.8107	.8291	.8480
.7	.8673	.8872	.9076	.9287	.9505	.9730	.9962	1.0203	1.0454	1.0714
.8	1.0986	1.1270	1.1568	1.1881	1.2212	1.2562	1.2933	1.3331	1.3758	1.4219

For example, a coefficient of correlation was computed for 30 observations of two variables. The resulting r was determined to be .60. It is desired to test the significance of this value. From Table 15, it can be seen that the value of z corresponding to a value of r of .60 is $z = .6931$. The standard error of z is $\frac{1}{\sqrt{N - 3}}$ or $\frac{1}{\sqrt{27}}$ which is equal to .1925. Using a $3\sigma_z$ confidence interval, it may be seen that the expected range of sampling variation for z is $.6931 \pm 3(.1925)$ or from .1156 to 1.2706. Since the table indicates that when $r = 0$, $z = 0$, and since it may not be expected (within the limits of the accepted confidence interval) that a value of z of zero could arise due to sampling variation or chance for the data of this problem, r may be said to indicate a significant association.

Further, the reliability of the coefficient of correlation also can be determined by this method. The limits of sampling variation (based on a $3\sigma_z$ confidence interval) in the cited problem are $z = .1156$ and $z = 1.2706$. Table 16 indicates the value of r corresponding to these two values of z. For $z = .1156$, r is between .1096 and .1194 or approximately .11. When $z = .2706$, r is slightly more than .8538 or approximately .85. It may be presumed, based on the degree of certainty indicated by the accepted confidence limit, that the r for the universe is between .11 and .85.

Table 16. Table of *r* for Values of *z* from 0 to 5

(Page 123)

The corresponding value of *r* for each value of *z* is given directly in the table. The body of the table contains the value of *r*, and the entries represent the values of *z*. The column headings indicate the values in the second decimal place of *z*.

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.0000	.0100	.0200	.0300	.0400	.0500	.0599	.0699	.0798	.0898
.1	.0997	.1096	.1194	.1293	.1391	.1489	.1587	.1684	.1781	.1878
.2	.1974	.2070	.2165	.2260	.2355	.2449	.2543	.2636	.2729	.2821
.3	.2913	.3004	.3095	.3185	.3275	.3364	.3452	.3540	.3627	.3714

For instructions and illustrations of the use of this table, see the instructions for Table 15.

Table 17. Table of Poisson Distribution for Selected Values of $\bar{X}$ (Poisson's Exponential Binomial Limit)

(Pages 124–133)

The Poisson Distribution is a probability distribution which applies where *p* is very small and *n* is large. It is useful in many areas of probability calculations, such as in the determination of occurrence of defects in quality control where the area of opportunity for occurrence is large but the number of defects per unit of area is small. The formula for this distribution is

$$e^{-\bar{X}}\left(1 + \frac{\bar{X}}{1!} + \frac{\bar{X}^2}{2!} + \frac{\bar{X}^3}{3!} + \dots\right)$$

Given the average defects per unit of area ($\bar{X}$) the relative distribution of occurrence of 0, 1, 2, 3, . . . defects may be secured from this table.

The table is arranged according to values of $\bar{X}$ (arithmetic mean) and indicates for each value of $\bar{X}$ the percentage occurrence of each number of defects (or other specified occurrences).

It is to be noted that the terms of the Poisson Distribution also give rise to an approximation of the Binomial Distribution, thus often rendering unnecessary the cumbersome calculation of those values. Where *n* is large and *p* is small, the agreement between the directly calculated values of the Poisson Distribution and the Binomial Distribution will be close.

able 18. Table of 3σ Confidence Limits for Binomial istribution in Per Cent for Sample Sizes 100 to 100,000 and p of .1% to 40%

(Pages 134–135)

The standard error of a per cent computed from a sample drawn t random, presuming a binomial distribution, is indicated as

$$\sigma_{\%} = \sqrt{\frac{pq}{N}}$$

The limits of variation of a per cent in a category in a sample rawn in this manner, if a 3σ confidence limit is accepted, may be xpressed by the following formula:

$$p \pm 3\sqrt{\frac{pq}{N}}$$

The calculated values of the limits are indicated in Table 18 for arious sample sizes from 100 to 100,000 and for p from .1% to 0%. On the first page of the table the upper limits are listed, nd the lower limits are shown on the second page.

per cent	Upper control limit													
	group size													
	100	150	200	300	400	500	600	800	1,000	1,500	2,000	3,000	4,000	5,000
20	32.00	29.80	28.49	26.93	26.00	25.37	24.90	24.24	23.79	23.10	22.68	22.19	21.90	21.70
25	37.99	35.61	34.19	32.50	31.50	30.81	30.30	29.59	29.11	28.35	27.90	27.37	27.05	26.84
30	43.75	41.23	39.72	37.94	36.82	36.15	35.61	34.86	34.35	33.55	33.07	32.51	32.17	31.94
35	49.31	46.68	45.12	43.26	42.15	41.40	40.84	40.06	39.52	38.70	38.20	37.61	37.26	37.02
40	54.70	52.00	50.39	48.49	47.35	46.57	46.00	45.20	44.65	43.79	43.28	42.68	42.32	42.08

per cent	Lower control limit													
	group size													
	100	150	200	300	400	500	600	800	1,000	1,500	2,000	3,000	4,000	5,000
20	8.00	10.20	11.51	13.07	14.00	14.63	15.10	15.76	16.21	16.90	17.32	17.81	18.10	18.30
25	12.01	14.39	15.81	17.50	18.50	19.19	19.70	20.41	20.89	21.65	22.10	22.63	22.95	23.16
30	16.25	18.77	20.28	22.06	23.18	23.85	24.39	25.14	25.65	26.45	26.93	27.49	27.83	28.06
35	20.69	23.32	24.88	26.74	27.85	28.60	29.16	29.94	30.48	31.30	31.80	32.39	32.74	32.98
40	25.30	28.00	29.61	31.51	32.65	33.43	34.00	34.80	35.35	36.21	36.72	37.32	37.68	37.92

An illustration of the use of the table may be seen in the followng example. In a recent survey of consumer buying habits in ndianapolis, Ind., it was found that 35% of the housewives uestioned, in a sample of 5,000, indicated that they used canned range juice. Presuming that the sample was drawn at random, the limits of variation due to sampling obtained from the table are 32.98% for the lower limit and 37.02% for the upper. Thus, based on a 3σ confidence limit, this sample could not have arisen from a population containing more than 37.02%, nor less than 32.98%, of canned orange juice users, 99.7 chances out of 100.

Table 19. Table of Sample Size Required for Finite Populations, for Confidence Limits and Specified Reliability Limits in Sampling Attributes in Per Cent

(Pages 136–137)

When sampling attributes, the sample size required to secure a stated degree of reliability may be secured directly from this table. The required size will be a per cent computed from a sample drawn at random from a finite universe, for two stated confidence limits. The table is stated in two parts. The first part is for a fiducial (confidence) limit of 95%, and the second is for a fiducial limit of 99.7% ($3\ \sigma$).

The table assumes a 50% distribution of the sampled attribute in the universe. This maximizes the sample size. For other values of distribution of the attribute in the universe, the sample size will be smaller.

The table is based on the formula:

$$\sigma_{\%} = \sqrt{\frac{pq}{n}\left(\frac{N-n}{N-1}\right)}$$

where

p = per cent of attribute in universe expressed as a decimal (assumed to be 50% or .50)
$q = 1 - p$
N = Size of universe
n = Size of sample

The use of this formula approximates the distribution of a percentage by use of the normal distribution as an estimate of the hypergeometrical distribution when the proportion of the universe in the sample is less than 50%.

For example, if it is desired to sample a population of 50,000 for some stated attribute (sex, brand preference, attitude, or other categorized attribute) with

1. assurance of an error not exceeding 1% and
2. a confidence limit of 99.7% or 99.7 chances out of 100

then the size of the sample required will be 15,517. (See p. 137.) If the attribute exists in the universe to an extent other than 50%, the sample size will be smaller.

To obtain the sample size for known or assumed distributions of the attribute other than 50%, multiply the given sample size for appropriate universe size and selected reliability by[1]

$$4[p(1 - p)]$$

where p is the known or assumed proportion of the attribute in the universe expressed as a decimal.

Where a double asterisk appears in the table in place of a sample size, the use of a sample equal in size to one half of the universe is advised. This will give somewhat more accuracy than is required. These values cannot be computed exactly by the formula outlined above.

Table 20. Table of Functions of *r*

(Pages 138–139)

The correlation technique in many of its phases involves the computation of various functions of r such as $\sqrt{1 - r^2}$, $1 - r^2$, etc. When r is known, these values may be secured directly from this table without further computation.

Values of Functions of *r*

r	$\sqrt{r}$	r^2	$\sqrt{r - r^2}$	$\sqrt{1 - r}$	$1 - r^2$	$\sqrt{1 - r^2}$	$100(1 - k)$	r
			$\sigma_{\infty \cdot 1}$	$\sigma_{(M)}$		k	% Eff.	
1.00	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	100.00	1.00
.99	.9950	.9801	.0995	.1000	.0199	.1411	85.89	.99
.98	.9899	.9604	.1400	.1414	.0396	.1990	80.10	.98
.97	.9849	.9409	.1706	.1732	.0591	.2431	75.69	.97
.96	.9798	.9216	.1960	.2000	.0784	.2800	72.00	.96

For example, the coefficient of alienation, k, is equal to $\sqrt{1 - r^2}$; the coefficient of determination is equal to r^2; the coefficient of non-determination equals $1 - r^2$; the index of predictive efficiency, E, equals 100% $(1 - k)$. The computation of the coefficient of reliability requires $\sqrt{r}$, and the coefficients of partial correlation involve the value $\sqrt{1 - r^2}$ in their computation. The table may also be used directly for the computation of the standard error of estimate for linear correlation as determined from the formula $S_y = \sigma\sqrt{1 - r^2}$. The standard error of the coefficient of correlation is obtained from the formula $\frac{1 - r^2}{\sqrt{N}}$, for which the value $1 - r^2$ may be secured from this table without computation.

---

[1] **This is an approximation but will be within 1 unit of the correct sample size.**

Table 21. Table of 5% and 1% Points for *r* and *R*

(Page 140)

The significance of a coefficient of correlation or multiple correlation may be evaluated by means of this table. It is based upon the null hypothesis that the population correlation equals zero. The maximum value of r (2 variables) and R (more than 2 variables) that might arise due to chance, as specified for a given number of variables at the top of the column and for a given number of degrees of freedom, is listed in the body of the table for the predetermined fiducial level (1% level figure in bold face type, 5% level in standard type). The number of degrees of freedom will be equal to $N - n_r$ where N is the number of groups of observations (pairs, triads, etc.) and n_r is the number of variables, counting both dependent and independent variables.

Degrees of Freedom	Number of Variables			
	2	3	4	5
24	.388	.470	.523	.562
	.496	**.565**	**.609**	**.642**
25	.381	.462	.514	.553
	.487	**.555**	**.600**	**.633**
26	.374	.454	.506	.545
	.478	**.546**	**.590**	**.624**
27	.367	.446	.498	.536
	.470	**.538**	**.582**	**.615**
28	.361	.439	.490	.529
	.463	**.530**	**.573**	**.606**
29	.355	.432	.482	.521
	.456	**.522**	**.565**	**.598**
30	.349	.426	.476	.514
	.449	**.514**	**.558**	**.591**
35	.325	.397	.445	.482
	.418	**.481**	**.523**	**.556**
40	.304	.373	.419	.455
	.393	**.454**	**.494**	**.526**
45	.288	.353	.397	.432
	.372	**.430**	**.470**	**.501**
50	.273	.336	.379	.412
	.354	**.410**	**.449**	**.479**

Thus, if a value of R for a multiple correlation is found to be .573, 40 degrees of freedom with 3 variables and a fiducial limit of 1% (bold face type) gives a value of .454. Since there is less than 1 chance in 100 that a coefficient of multiple correlation as high as .454 might arise due to sampling variation, and the computed value considerably exceeds this value, the multiple association may be considered significant.

Table 22. Table of Probability of Occurrence of Statistical Deviations of Different Magnitudes Relative to the Standard Error

(Page 141)

The probability of occurrence and the odds against the occurrence of a deviation as great as, or greater than, a designated number of standard errors are shown in this table.

Table 23. Table of Random Numbers

(Pages 142–145)

Although the application of sampling theory often assumes that the sample at hand was drawn at random, actual accomplishment of randomness is extremely difficult by ordinary methods. To facilitate the drawing of random samples and for other purposes, the Table of Random Numbers, a section of the more extended tables of Kendall and Smith,[1] is provided.

If it is desired to secure a random sample of observations which can be or have been numbered, such as a series of observations located in a numbered file or in a book with numbered pages and lines, or in any form in which it is practicable to count the observations or number them, the sample may be secured at random from the Table of Random Numbers. A series of random numbers is selected from the table equal to the number of observations desired. The observations with the corresponding numbers are used. The columns of digits may be combined to give rise to numbers containing the requisite number of digits.

For example, it is desired to draw a sample of 350 cards containing specified data from a numbered file containing 8,573 cards. Since the card numbers involve a maximum of four digits, groups of four numbers will be used. The random numbers may be selected by starting at the beginning of the table, at any point selected at random, or at the start of any group, and using the cards with numbers corresponding to the first 350 groups of four-digit random numbers taken from the table. If numbers exceeding 8,573 (the last number in the file) are encountered, they are discarded and the next random number is used. Numbers higher than those associated with the observations (in this case 8,573) which are discarded are not counted in securing the necessary total of 350 observations.

---

[1] M. G. Kendall and B. B. Smith, *Tables of Random Sampling Numbers*, Tracts for Computers XXIV (London: Cambridge University Press, 1939).

First Thousand										
	1–4	5–8	9–12	13–16	17–20	21–24	25–28	29–32	33–36	37–40
1	23 15	75 48	59 01	83 72	59 93	76 24	97 08	86 95	23 03	67 44
2	05 54	55 50	43 10	53 74	35 08	90 61	18 37	44 10	96 22	13 43
3	14 87	16 03	50 32	40 43	62 23	50 05	10 03	22 11	54 38	08 34
4	38 97	67 49	51 94	05 17	58 53	78 80	59 01	94 32	42 87	16 95
5	97 31	26 17	18 99	75 53	08 70	94 25	12 58	41 54	88 21	05 13

In the illustration, the first group of random numbers (row 1, column 1–4) is 2,315. The card with that number is withdrawn from the file. The operation continues until the desired 350 cards have been obtained. The numbers are read as in a book, row by row from left to right. The seventh group of random numbers (row 1, column 25–28), 9,708, exceeds the highest number in the file and is discarded.

Kendall and Smith[1] warn that "it was shown . . . that the use of the same set of random numbers over and over in *the same sampling experiment* was illegitimate. . . ." For this reason, *repeated* samplings *of the same population* requiring more than the total number of random numbers given should be accomplished by resort to a more extended table such as may be found in:

Kendall, M. G., and B. B. Smith, *Tables of Random Sampling Numbers*, Tracts for Computers XXIV, Cambridge University Press, London, 1939.

Tippett, L. H. C., *Random Sampling Numbers*, Tracts for Computers XV, Cambridge University Press, London, 1927.

However, most sampling investigations, other than those of an experimental nature, require the drawing of *one* or at the most two or three random samples containing a specified number of observations from a given population, and this table will serve the purpose.

Table 24. Table of Natural Trigonometric Functions

(Pages 146–151)

The sines, cosines, tangents, and cotangents are given for every tenth minute of every degree from 0° to 90°.

Table 25. Table of Important Constants

(Page 152)

A number of important constants useful in statistical calculations are listed as a convenient reference. The values are stated to 15 decimal places.

---

[1] Kendall and Smith, *op. cit.*, p. vii.

THE GREEK ALPHABET

Α	α	alpha
Β	β	beta
Γ	γ	gamma
Δ	δ	delta
Ε	ϵ	epsilon
Ζ	ζ	zeta
Η	η	eta
Θ	θ	theta
Ι	ι	iota
Κ	κ	kappa
Λ	λ	lambda
Μ	μ	mu
Ν	ν	nu
Ξ	ξ	xi
Ο	ο	omicron
Π	π	pi
Ρ	ρ	rho
Σ	σ	sigma
Τ	τ	tau
ϒ	υ	upsilon
Φ	ϕ	phi
Χ	χ	chi
Ψ	ψ	psi
Ω	ω	omega

TABLE 1. TABLE OF SQUARES, 100–1,000

	N^2 0	N^2 1	N^2 2	N^2 3	N^2 4	N^2 5	N^2 6	N^2 7	N^2 8	N^2 9
100	10000	10201	10404	10609	10816	11025	11236	11449	11664	11881
110	12100	12321	12544	12769	12996	13225	13456	13689	13924	14161
120	14400	14641	14884	15129	15376	15625	15876	16129	16384	16641
130	16900	17161	17424	17689	17956	18225	18496	18769	19044	19321
140	19600	19881	20164	20449	20736	21025	21316	21609	21904	22201
150	22500	22801	23104	23409	23716	24025	24336	24649	24964	25281
160	25600	25921	26244	26569	26896	27225	27556	27889	28224	28561
170	28900	29241	29584	29929	30276	30625	30976	31329	31684	32041
180	32400	32761	33124	33489	33856	34225	34596	34969	35344	35721
190	36100	36481	36864	37249	37636	38025	38416	38809	39204	39601
200	40000	40401	40804	41209	41616	42025	42436	42849	43264	43681
210	44100	44521	44944	45369	45796	46225	46656	47089	47524	47961
220	48400	48841	49284	49729	50176	50625	51076	51529	51984	52441
230	52900	53361	53824	54289	54756	55225	55696	56169	56644	57121
240	57600	58081	58564	59049	59536	60025	60516	61009	61504	62001
250	62500	63001	63504	64009	64516	65025	65536	66049	66564	67081
260	67600	68121	68644	69169	69696	70225	70756	71289	71824	72361
270	72900	73441	73984	74529	75076	75625	76176	76729	77284	77841
280	78400	78961	79524	80089	80656	81225	81796	82369	82944	83521
290	84100	84681	85264	85849	86436	87025	87616	88209	88804	89401
300	90000	90601	91204	91809	92416	93025	93636	94249	94864	95481
310	96100	96721	97344	97969	98596	99225	99856	100489	101124	101761
320	102400	103041	103684	104329	104976	105625	106276	106929	107584	108241
330	108900	109561	110224	110889	111556	112225	112896	113569	114244	114921
340	115600	116281	116964	117649	118336	119025	119716	120409	121104	121801
350	122500	123201	123904	124609	125316	126025	126736	127449	128164	128881
360	129600	130321	131044	131769	132496	133225	133956	134689	135424	136161
370	136900	137641	138384	139129	139876	140625	141376	142129	142884	143641
380	144400	145161	145924	146689	147456	148225	148996	149769	150544	151321
390	152100	152881	153664	154449	155236	156025	156816	157609	158404	159201
400	160000	160801	161604	162409	163216	164025	164836	165649	166464	167281
410	168100	168921	169744	170569	171396	172225	173056	173889	174724	175561
420	176400	177241	178084	178929	179776	180625	181476	182329	183184	184041
430	184900	185761	186624	187489	188356	189225	190096	190969	191844	192721
440	193600	194481	195364	196249	197136	198025	198916	199809	200704	201601
450	202500	203401	204304	205209	206116	207025	207936	208849	209764	210681
460	211600	212521	213444	214369	215296	216225	217156	218089	219024	219961
470	220900	221841	222784	223729	224676	225625	226576	227529	228484	229441
480	230400	231361	232324	233289	234256	235225	236196	237169	238144	239121
490	240100	241081	242064	243049	244036	245025	246016	247009	248004	249001
500	250000	251001	252004	253009	254016	255025	256036	257049	258064	259081
510	260100	261121	262144	263169	264196	265225	266256	267289	268324	269361
520	270400	271441	272484	273529	274576	275625	276676	277729	278784	279841
530	280900	281961	283024	284089	285156	286225	287296	288369	289444	290521
540	291600	292681	293764	294849	295936	297025	298116	299209	300304	301401

Source: Herbert Arkin and Raymond R. Colton, *An Outline of Statistical Methods* (4th ed.: New York: Barnes & Noble, 1939).

SQUARES

	N^2	N^2	N^2	N^2	N^2	N^2	N^2	N^2	N^2	N^2
	0	1	2	3	4	5	6	7	8	9
550	302500	303601	304704	305809	306916	308025	309136	310249	311364	312481
560	313600	314721	315844	316969	318096	319225	320356	321489	322624	323761
570	324900	326041	327184	328329	329476	330625	331776	332929	334084	335241
580	336400	337561	338724	339889	341056	342225	343396	344569	345744	346921
590	348100	349281	350464	351649	352836	354025	355216	356409	357604	358801
600	360000	361201	362404	363609	364816	366025	367236	368449	369664	370881
610	372100	373321	374544	375769	376996	378225	379456	380689	381924	383161
620	384400	385641	386884	388129	389376	390625	391876	393129	394384	395641
630	396900	398161	399424	400689	401956	403225	404496	405769	407044	408321
640	409600	410881	412164	413449	414736	416025	417316	418609	419904	421201
650	422500	423801	425104	426409	427716	429025	430336	431649	432964	434281
660	435600	436921	438244	439569	440896	442225	443556	444889	446224	447561
670	448900	450241	451584	452929	454276	455625	456976	458329	459684	461041
680	462400	463761	465124	466489	467856	469225	470596	471969	473344	474721
690	476100	477481	478864	480249	481636	483025	484416	485809	487204	488601
700	490000	491401	492804	494209	495616	497025	498436	499849	501264	502681
710	504100	505521	506944	508369	509796	511225	512656	514089	515524	516961
720	518400	519841	521284	522729	524176	525625	527076	528529	529984	531441
730	532900	534361	535824	537289	538756	540225	541696	543169	544644	546121
740	547600	549081	550564	552049	553536	555025	556516	558009	559504	561001
750	562500	564001	565504	567009	568516	570025	571536	573049	574564	576081
760	577600	579121	580644	582169	583696	585225	586756	588289	589824	591361
770	592900	594441	595984	597529	599076	600625	602176	603729	605284	606841
780	608400	609961	611524	613089	614656	616225	617796	619369	620944	622521
790	624100	625681	627264	628849	630436	632025	633616	635209	636804	638401
800	640000	641601	643204	644809	646416	648025	649636	651249	652864	654481
810	656100	657721	659344	660969	662596	664225	665856	667489	669124	670761
820	672400	674041	675684	677329	678976	680625	682276	683929	685584	687241
830	688900	690561	692224	693889	699556	697225	698896	700569	702244	703921
840	705600	707281	708964	710649	712336	714025	715716	717409	719104	720801
850	722500	724201	725904	727609	729316	731025	732736	734449	736164	737881
860	739600	741321	743044	744769	746496	748225	749956	751689	753424	755161
870	756900	758641	760384	762129	763876	765625	767376	769129	770884	772641
880	774400	776161	777924	779689	781456	783225	784996	786769	788544	790321
890	792100	793881	795664	797449	799236	801025	802816	804609	806404	808201
900	810000	811801	813604	815409	817216	819025	820836	822649	824464	826281
910	828100	829921	831744	833569	835396	837225	839056	840889	842724	844561
920	846400	848241	850084	851929	853776	855625	857476	859329	861184	863041
930	864900	866761	868624	870489	872356	874225	876096	877969	879844	881721
940	883600	885481	887364	889249	891136	893025	894916	896809	898704	900601
950	902500	904401	906304	908209	910116	912025	913936	915849	917764	919681
960	921600	923521	925444	927369	929296	931225	933156	935089	937024	938961
970	940900	942841	944784	946729	948676	950625	952576	954529	956484	958441
980	960400	962361	964324	966289	968256	970225	972196	974169	976144	978121
990	980100	982081	984064	986049	988036	990025	992016	994009	996004	998001

TABLE 2. TABLE OF SQUARE ROOTS, 1,000–10,000

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	30+	100+	30+	100+	30+	100+	30+	100+	30+	100+
1000	1.6228	0.0000	1.6386	0.0500	1.6544	0.1000	1.6702	0.1499	1.6860	0.1998
1010	1.7805	0.4988	1.7962	0.5485	1.8119	0.5982	1.8277	0.6479	1.8434	0.6976
1020	1.9374	0.9950	1.9531	1.0445	1.9687	1.0940	1.9844	1.1435	2.0000	1.1929
1030	2.0936	1.4889	2.1092	1.5382	2.1248	1.5874	2.1403	1.6366	2.1559	1.6858
1040	2.2490	1.9804	2.2645	2.0294	2.2800	2.0784	2.2955	2.1274	2.3110	2.1763
1050	2.4037	2.4695	2.4191	2.5183	2.4345	2.5671	2.4500	2.6158	2.4654	2.6645
1060	2.5576	2.9563	2.5730	3.0049	2.5883	3.0534	2.6037	3.1019	2.6190	3.1504
1070	2.7109	3.4408	2.7261	3.4891	2.7414	3.5374	2.7567	3.5857	2.7719	3.6340
1080	2.8634	3.9230	2.8786	3.9712	2.8938	4.0192	2.9090	4.0673	2.9242	4.1153
1090	3.0151	4.4031	3.0303	4.4510	3.0454	4.4988	3.0606	4.5466	3.0757	4.5945
1100	3.1662	4.8809	3.1813	4.9285	3.1964	4.9762	3.2114	5.0238	3.2265	5.0714
1110	3.3167	5.3566	3.3317	5.4040	3.3467	5.4514	3.3617	5.4988	3.3766	5.5462
1120	3.4664	5.8301	3.4813	5.8773	3.4963	5.9245	3.5112	5.9717	3.5261	6.0189
1130	3.6155	6.3015	3.6303	6.3485	3.6452	6.3955	3.6601	6.4425	3.6749	6.4894
1140	3.7639	6.7708	3.7787	6.8176	3.7935	6.8644	3.8083	6.9112	3.8231	6.9579
1150	3.9117	7.2381	3.9264	7.2847	3.9411	7.3313	3.9559	7.3778	3.9706	7.4244
1160	4.0588	7.7033	4.0735	7.7497	4.0881	7.7961	4.1028	7.8425	4.1174	7.8888
1170	4.2053	8.1666	4.2199	8.2128	4.2345	8.2589	4.2491	8.3051	4.2637	8.3513
1180	4.3511	8.6278	4.3657	8.6738	4.3802	8.7198	4.3948	8.7658	4.4093	8.8118
1190	4.4964	9.0871	4.5109	9.1329	4.5254	9.1788	4.5398	9.2245	4.5543	9.2703
1200	4.6410	9.5445	4.6554	9.5901	4.6699	9.6358	4.6843	9.6814	4.6987	9.7269
1210	4.7851	10.0000	4.7994	10.0454	4.8138	10.0909	4.8282	10.1363	4.8425	10.1817
1220	4.9285	10.4536	4.9428	10.4989	4.9571	10.5441	4.9714	10.5893	4.9857	10.6345
1230	5.0714	10.9054	5.0856	10.9504	5.0999	10.9955	5.1141	11.0405	5.1283	11.0856
1240	5.2136	11.3553	5.2278	11.4002	5.2420	11.4451	5.2562	11.4899	5.2704	11.5347
1250	5.3553	11.8034	5.3695	11.8481	5.3836	11.8928	5.3977	11.9375	5.4119	11.9821
1260	5.4965	12.2497	5.5106	12.2943	5.5246	12.3388	5.5387	12.3833	5.5528	12.4278
1270	5.6371	12.6943	5.6511	12.7386	5.6651	12.7830	5.6791	12.8273	5.6931	12.8716
1280	5.7771	13.1371	5.7911	13.1813	5.8050	13.2254	5.8190	13.2696	5.8329	13.3137
1290	5.9166	13.5782	5.9305	13.6222	5.9444	13.6662	5.9583	13.7102	5.9722	13.7541
1300	6.0555	14.0175	6.0694	14.0614	6.0832	14.1052	6.0971	14.1490	6.1109	14.1928
1310	6.1939	14.4552	6.2077	14.4989	6.2215	14.5426	6.2353	14.5862	6.2491	14.6298
1320	6.3318	14.8913	6.3456	14.9348	6.3593	14.9783	6.3731	15.0217	6.3868	15.0652
1330	6.4692	15.3256	6.4829	15.3690	6.4966	15.4123	6.5103	15.4556	6.5240	15.4989
1340	6.6060	15.7584	6.6197	15.8016	6.6333	15.8447	6.6470	15.8879	6.6606	15.9310
1350	6.7423	16.1895	6.7560	16.2325	6.7696	16.2755	6.7831	16.3185	6.7967	16.3615
1360	6.8782	16.6190	6.8917	16.6619	6.9053	16.7048	6.9188	16.7476	6.9324	16.7904
1370	7.0135	17.0470	7.0270	17.0897	7.0405	17.1324	7.0540	17.1751	7.0675	17.2177
1380	7.1484	17.4734	7.1618	17.5160	7.1753	17.5586	7.1887	17.6010	7.2022	17.6435
1390	7.2827	17.8983	7.2961	17.9407	7.3095	17.9831	7.3229	18.0254	7.3363	18.0678
1400	7.4166	18.3216	7.4299	18.3638	7.4433	18.4061	7.4566	18.4483	7.4700	13.4905
1410	7.5500	18.7434	7.5633	18.7855	7.5766	18.8276	7.5899	18.8697	7.6032	18.9117
1420	7.6829	19.1638	7.6962	19.2057	7.7094	19.2476	7.7227	19.2896	7.7359	19.3315
1430	7.8153	19.5826	7.8286	19.6244	7.8418	19.6662	7.8550	19.7080	7.8682	19.7497
1440	7.9473	20.0000	7.9605	20.0417	7.9737	20.0853	7.9868	20.1249	8.0000	20.1666
	30+	100+	30+	100+	30+	100+	30+	100+	30+	100+

Source: Herbert Arkin and Raymond R. Colton, *An Outline of Statistical Methods* (4th ed.: New York: Barnes & Noble, 1939).

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
30+	100+	30+	100+	30+	100+	30+	100+	30+	100+	
1.7017	0.2497	1.7175	0.2996	1.7333	0.3494	1.7490	0.3992	1.7648	0.4490	1000
1.8591	0.7472	1.8748	0.7968	1.8904	0.8464	1.9061	0.8960	1.9218	0.9455	1010
2.0156	1.2423	2.0312	1.2917	2.0468	1.3410	2.0624	1.3903	2.0780	1.4396	1020
2.1714	1.7360	2.1870	1.7841	2.2025	1.8332	2.2180	1.8823	2.2335	1.9315	1030
2.3265	2.2252	2.3419	2.2741	2.3574	2.3230	2.3728	2.3719	2.3883	2.4207	1040
2.4808	2.7132	2.4962	2.7619	2.5115	2.8105	2.5269	2.8591	2.5423	2.9077	1050
2.6343	3.1988	2.6497	3.2473	2.6650	3.2957	2.6803	3.3441	2.6956	3.3925	1060
2.7872	3.6822	2.8024	3.7304	2.8177	3.7786	2.8329	3.8268	2.8481	3.8749	1070
2.9393	4.1633	2.9545	4.2113	2.9697	4.2593	2.9848	4.3072	3.0000	4.3552	1080
3.0908	4.6422	3.1059	4.6900	3.1210	4.7378	3.1361	4.7855	3.1512	4.8332	1090
3.2415	5.1190	3.2566	5.1665	3.2716	5.2141	3.2866	5.2616	3.3017	5.3091	1100
3.3916	5.5936	3.4066	5.6409	3.4216	5.6882	3.4365	5.7355	3.4515	5.7828	1110
3.5410	6.0660	3.5559	6.1131	3.5708	6.1603	3.5857	6.2073	3.6006	6.2544	1120
3.6898	6.5364	3.7046	6.5833	3.7194	6.6302	3.7343	6.6771	3.7491	6.7239	1130
3.8378	7.0047	3.8526	7.0514	3.8674	7.0981	3.8821	7.1448	3.8969	7.1914	1140
3.9853	7.4709	4.0000	7.5174	4.0147	7.5639	4.0294	7.6104	4.0441	7.6569	1150
4.1321	7.9352	4.1467	7.9815	4.1614	8.0278	4.1760	8.0740	4.1906	8.1203	1160
4.2783	8.3974	4.2929	8.4435	4.3074	8.4896	4.3220	8.5357	4.3366	8.5818	1170
4.4238	8.8577	4.4384	8.9036	4.4529	8.9495	4.4674	8.9954	4.4819	9.0413	1180
4.5688	9.3161	4.5832	9.3618	4.5977	9.4075	4.6121	9.4532	4.6266	9.4989	1190
4.7131	9.7725	4.7275	9.8180	4.7419	9.8636	4.7563	9.9091	4.7707	9.9545	1200
4.8569	10.2270	4.8712	10.2724	4.8855	10.3177	4.8999	10.3630	4.9142	10.4083	1210
5.0000	10.6797	5.0143	10.7249	5.0286	10.7700	5.0428	10.8152	5.0571	10.8603	1220
5.1426	11.1306	5.1568	11.1755	5.1710	11.2205	5.1852	11.2654	5.1994	11.3104	1230
5.2846	11.5796	5.2987	11.6244	5.3129	11.6692	5.3270	11.7139	5.3412	11.7587	1240
5.4260	12.0268	5.4401	12.0714	5.4542	12.1160	5.4683	12.1606	5.4824	12.2052	1250
5.5668	12.4722	5.5809	12.5167	5.5949	12.5611	5.6090	12.6055	5.6230	12.6499	1260
5.7071	12.9159	5.7211	12.9602	5.7351	13.0044	5.7491	13.0487	5.7631	13.0929	1270
5.8469	13.3578	5.8608	13.4019	5.8748	13.4460	5.8887	13.4901	5.9026	13.5341	1280
5.9861	13.7981	6.0000	13.8420	6.0139	13.8859	6.0278	13.9298	6.0416	13.9737	1290
6.1248	14.2366	6.1386	14.2804	6.1525	14.3241	6.1663	14.3678	6.1801	14.4115	1300
6.2629	14.6734	6.2767	14.7170	6.2905	14.7606	6.3043	14.8042	6.3180	14.8477	1310
6.4005	15.1086	6.4143	15.1521	6.4280	15.1955	6.4417	15.2389	6.4555	15.2823	1320
6.5377	15.5422	6.5513	15.5855	6.5650	15.6287	6.5787	15.6720	6.5923	15.7152	1330
6.6742	15.9741	6.6879	16.0172	6.7015	16.0603	6.7151	16.1034	6.7287	16.1465	1340
6.8103	16.4045	6.8239	16.4474	6.8375	16.4903	6.8511	16.5333	6.8646	16.5762	1350
6.9459	16.8332	6.9594	16.8760	6.9730	16.9188	6.9865	16.9615	7.0000	17.0043	1360
7.0810	17.2604	7.0945	17.3030	7.1080	17.3456	7.1214	17.3882	7.1349	17.4308	1370
7.2156	17.6860	7.2290	17.7285	7.2424	17.7710	7.2559	17.8134	7.2693	17.8558	1380
7.3497	18.1101	7.3631	18.1524	7.3765	18.1948	7.3898	18.2371	7.4032	18.2793	1390
7.4833	18.5327	7.4967	18.5749	7.5100	18.6170	7.5233	18.6592	7.5366	18.7013	1400
7.6165	18.9538	7.6298	18.9958	7.6431	19.0378	7.6563	19.0798	7.6696	19.1218	1410
7.7492	19.3734	7.7624	19.4152	7.7757	19.4571	7.7889	19.4990	7.8021	19.5408	1420
7.8814	19.7915	7.8946	19.8332	7.9078	19.8749	7.9210	19.9166	7.9342	19.9583	1430
8.0132	20.2082	8.0263	20.2497	8.0395	20.2913	8.0526	20.3329	8.0657	20.3744	1440
30+	100+	30+	100+	30+	100+	30+	100+	30+	100+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	30.+	100+	30+	100+	30+	100+	30+	100+	30+	100+
1450	8.0789	20.4159	8.0920	20.4575	8.1051	20.4990	8.1182	20.5405	8.1314	20.5819
1460	8.2099	20.8305	8.2230	20.8718	8.2361	20.9132	8.2492	20.9545	8.2623	20.9959
1470	8.3406	21.2436	8.3536	21.2848	8.3667	21.3260	8.3797	21.3672	8.3927	21.4084
1480	8.4708	21.6553	8.4838	21.6963	8.4968	21.7374	8.5097	21.7785	8.5227	21.8195
1490	8.6005	22.0656	8.6135	22.1065	8.6264	22.1475	8.6394	22.1884	8.6523	22.2293
1500	8.7298	22.4745	8.7427	22.5153	8.7556	22.5561	8.7685	22.5969	8.7814	22.6377
1510	8.8587	22.8821	8.8716	22.9227	8.8844	22.9634	8.8973	23.0041	8.9102	23.0447
1520	8.9872	23.2883	9.0000	23.3288	9.0128	23.3694	9.0256	23.4099	9.0384	23.4504
1530	9.1152	23.6932	9.1280	23.7336	9.1408	23.7740	9.1535	23.8144	9.1663	23.8548
1540	9.2428	24.0967	9.2556	24.1370	9.2683	24.1773	9.2810	24.2176	9.2938	24.2578
1550	9.3700	24.4990	9.3827	24.5392	9.3954	24.5793	9.4081	24.6194	9.4208	24.6595
1560	9.4968	24.9000	9.5095	24.9400	9.5221	24.9800	9.5348	25.0200	9.5474	25.0600
1570	9.6232	25.2996	9.6358	25.3395	9.6485	25.3794	9.6611	25.4193	9.6737	25.4592
1580	9.7492	25.6981	9.7618	25.7378	9.7744	25.7776	9.7869	25.8173	9.7995	25.8571
1590	9.8748	26.0952	9.8873	26.1348	9.8999	26.1745	9.9124	26.2141	9.9249	26.2537
1600	*0.0000	26.4911	*0.0125	26.5306	*0.0250	26.5701	*0.0375	26.6096	*0.0500	26.6491
1610	0.1248	26.8858	0.1373	26.9252	0.1497	26.9646	0.1622	27.0039	0.1746	27.0433
1620	0.2492	27.2792	0.2616	27.3185	0.2741	27.3578	0.2865	27.3970	0.2989	27.4363
1630	0.3733	27.6715	0.3856	27.7106	0.3980	27.7498	0.4104	27.7889	0.4228	27.8280
1640	0.4969	28.0625	0.5093	28.1015	0.5216	28.1405	0.5339	28.1796	0.5463	28.2186
1650	0.6202	28.4523	0.6325	28.4912	0.6448	28.5302	0.6571	28.5690	0.6694	28.6079
1660	0.7431	28.8410	0.7554	28.8798	0.7676	28.9186	0.7799	28.9574	0.7922	28.9961
1670	0.8656	29.2285	0.8779	29.2672	0.8901	29.3058	0.9023	29.3445	0.9145	29.3832
1680	0.9878	29.6148	1.0000	29.6534	1.0122	29.6919	1.0244	29.7305	1.0366	29.7690
1690	1.1096	30.0000	1.1218	30.0385	1.1339	30.0769	1.1461	30.1153	1.1582	30.1538
1700	1.2311	30.3840	1.2432	30.4224	1.2553	30.4607	1.2674	30.4990	1.2795	30.5374
1710	1.3521	30.7670	1.3642	30.8052	1.3763	30.8434	1.3884	30.8816	1.4005	30.9198
1720	1.4729	31.1488	1.4849	31.1869	1.4970	31.2250	1.5090	31.2631	1.5211	31.3012
1730	1.5933	31.5295	1.6053	31.5675	1.6173	31.6055	1.6293	31.6435	1.6413	31.6814
1740	1.7133	31.9091	1.7253	31.9470	1.7373	31.9848	1.7493	32.0227	1.7612	32.0606
1750	1.8330	32.2876	1.8450	32.3254	1.8569	32.3631	1.8688	32.4009	1.8808	32.4387
1760	1.9524	32.6650	1.9643	32.7027	1.9762	32.7403	1.9881	32.7780	2.0000	32.8157
1770	2.0714	33.0413	2.0833	33.0789	2.0951	33.1165	2.1070	33.1540	2.1189	33.1916
1780	2.1900	33.4166	2.2019	33.4541	2.2137	33.4916	2.2256	33.5290	2.2374	33.5665
1790	2.3084	33.7909	2.3202	33.8282	2.3320	33.8656	2.3438	33.9030	2.3556	33.9403
1800	2.4264	34.1641	2.4382	34.2013	2.4500	34.2386	2.4617	34.2758	2.4735	34.3131
1810	2.5441	34.5362	2.5558	34.5734	2.5676	34.6105	2.5793	34.6477	2.5911	34.6848
1820	2.6615	34.9074	2.6732	34.9444	2.6849	34.9815	2.6966	35.0185	2.7083	35.0555
1830	2.7785	35.2775	2.7902	35.3144	2.8019	35.3514	2.8135	35.3883	2.8252	35.4253
1840	2.8952	35.6466	2.9069	35.6835	2.9185	35.7203	2.9302	35.7571	2.9418	35.7940
1850	3.0116	36.0147	3.0233	36.0515	3.0349	36.0882	3.0465	36.1249	3.0581	36.1617
1860	3.1277	36.3818	3.1393	36.4185	3.1509	36.4551	3.1625	36.4918	3.1741	36.5284
1870	3.2435	36.7479	3.2551	36.7845	3.2666	36.8211	3.2782	36.8576	3.2897	36.8941
1880	3.3590	37.1131	3.3705	37.1496	3.3820	37.1860	3.3935	37.2224	3.4051	37.2589
1890	3.4741	37.4773	3.4856	37.5136	3.4971	37.5500	3.5086	37.5863	3.5201	37.6227
	40+	100+	40+	100+	40+	100+	40+	100+	40+	100+

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
30+	100+	30+	100+	30+	100+	30+	100+	30+	100+	
8.1445	20.6234	8.1576	20.6648	8.1707	20.7063	8.1838	20.7477	8.1969	20.7891	1450
8.2753	21.0372	8.2884	21.0785	8.3014	21.1198	8.3145	21.1611	8.3275	21.2023	1460
8.4057	21.4496	8.4187	21.4907	8.4318	21.5319	8.4418	21.5730	8.4578	21.6141	1470
8.5357	21.8606	8.5487	21.9016	8.5616	21.9426	8.5746	21.9836	8.5876	22.0246	1480
8.6652	22.2702	8.6782	22.3111	8.6911	22.3520	8.7040	22.3928	8.7169	22.4337	1490
8.7943	22.6784	8.8072	22.7192	8.8201	22.7599	8.8330	22.8007	8.8458	22.8414	1500
8.9230	23.0853	8.9358	23.1260	8.9487	23.1666	8.9615	23.2071	8.9744	23.2477	1510
9.0512	23.4909	9.0641	23.5314	9.0768	23.5718	9.0896	23.6123	9.1024	23.6527	1520
9.1791	23.8951	9.1918	23.9355	9.2046	23.9758	9.2173	24.0161	9.2301	24.0564	1530
9.3065	24.2980	9.3192	24.3382	9.3319	24.3785	9.3446	24.4186	9.3573	24.4588	1540
9.4335	24.6996	9.4462	24.7397	9.4588	24.7798	9.4715	24.8199	9.4842	24.8599	1550
9.5601	25.1000	9.5727	25.1399	9.5854	25.1799	9.5980	25.2198	9.6106	25.2597	1560
9.6863	25.4990	9.6989	25.5388	9.7115	25.5787	9.7240	25.6185	9.7366	25.6583	1570
9.8121	25.8968	9.8246	25.9365	9.8372	25.9762	9.8497	26.0159	9.8623	26.0555	1580
9.9375	26.2933	9.9500	26.3329	9.9625	26.3725	9.9750	26.4120	9.9875	26.4516	1590
*0.0625	26.6886	*0.0749	26.7281	*0.0874	26.7675	*0.0999	26.8069	*0.1123	26.8464	1600
0.1871	27.0827	0.1995	27.1220	0.2119	27.1613	0.2244	27.2006	0.2368	27.2399	1610
0.3113	27.4755	0.3237	27.5147	0.3361	27.5539	0.3485	27.5931	0.3609	27.6323	1620
0.4351	27.8671	0.4475	27.9062	0.4599	27.9453	0.4722	27.9844	0.4846	28.0234	1630
0.5586	28.2576	0.5709	28.2965	0.5832	28.3355	0.5956	28.3745	0.6079	28.4134	1640
0.6817	28.6468	0.6940	28.6857	0.7063	28.7245	0.7185	28.7633	0.7308	28.8022	1650
0.8044	29.0349	0.8167	29.0736	0.8289	29.1124	0.8412	29.1511	0.8534	29.1898	1660
0.9268	29.4218	0.9390	29.4604	0.9512	29.4990	0.9634	29.5376	0.9756	29.5762	1670
1.0488	29.8076	1.0609	29.8461	1.0731	29.8846	1.0853	29.9231	1.0974	29.9615	1680
1.1704	30.1922	1.1825	30.2306	1.1947	30.2690	1.2068	30.3073	1.2189	30.3457	1690
1.2916	30.5756	1.3038	30.6139	1.3159	30.6522	1.3280	30.6905	1.3401	30.7287	1700
1.4126	30.9580	1.4246	30.9962	1.4367	31.0343	1.4488	31.0725	1.4608	31.1106	1710
1.5331	31.3393	1.5452	31.3773	1.5572	31.4154	1.5692	31.4534	1.5812	31.4914	1720
1.6533	31.7194	1.6653	31.7574	1.6773	31.7953	1.6893	31.8332	1.7013	31.8711	1730
1.7732	32.0984	1.7852	32.1363	1.7971	32.1741	1.8091	32.2120	1.8210	32.2498	1740
1.8927	32.4764	1.9047	32.5142	1.9166	32.5519	1.9285	32.5896	1.9404	32.6273	1750
2.0119	32.8533	2.0238	32.8909	2.0357	32.9286	2.0476	32.9662	2.0595	33.0038	1760
2.1307	33.2291	2.1426	33.2667	2.1545	33.3042	2.1663	33.3417	2.1782	33.3792	1770
2.2493	33.6039	2.2611	33.6413	2.2729	33.6787	2.2847	33.7161	2.2966	33.7535	1780
2.3674	33.9776	2.3792	34.0149	2.3910	34.0522	2.4028	34.0895	2.4146	34.1268	1790
2.4853	34.3503	2.4971	34.3875	2.5088	34.4247	2.5206	34.4619	2.5323	34.4991	1800
2.6028	34.7219	2.6146	34.7590	2.6263	34.7961	2.6380	34.8332	2.6497	34.8703	1810
2.7200	35.0926	2.7317	35.1296	2.7434	35.1666	2.7551	35.2036	2.7668	35.2405	1820
2.8369	35.4622	2.8486	35.4991	2.8602	35.5360	2.8719	35.5729	2.8836	35.6097	1830
2.9535	35.8308	2.9651	35.8676	2.9767	35.9044	2.9884	35.9412	3.0000	35.9779	1840
3.0697	36.1984	3.0813	36.2351	3.0929	36.2718	3.1045	36.3085	3.1161	36.3452	1850
3.1856	36.5650	3.1972	36.6016	3.2088	36.6382	3.2204	36.6748	3.2319	36.7114	1860
3.3013	36.9306	3.3128	36.9671	3.3244	37.0037	3.3359	37.0401	3.3474	37.0766	1870
3.4166	37.2953	3.4281	37.3317	3.4396	37.3681	3.4511	37.4045	3.4626	37.4409	1880
3.5316	37.6590	3.5431	37.6953	3.5546	37.7316	3.5660	37.7679	3.5775	37.8042	1890
40+	100+	40+	100+	40+	100+	40+	100+	40+	100+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	40+	100+	40+	100+	40+	100+	40+	100+	40+	100+
1900	3.5890	37.8405	3.6005	37.8768	3.6119	37.9130	3.6234	37.9493	3.6348	37.9855
1910	3.7035	38.2028	3.7150	38.2389	3.7264	38.2751	3.7379	38.3112	3.7493	38.3474
1920	3.8178	38.5641	3.8292	38.6001	3.8406	38.6362	3.8520	38.6723	3.8634	38.7083
1930	3.9318	38.9244	3.9431	38.9604	3.9545	38.9964	3.9659	39.0324	3.9773	39.0683
1940	4.0454	39.2839	4.0568	39.3198	4.0681	39.3557	4.0795	39.3915	4.0908	39.4274
1950	4.1588	39.6424	4.1701	39.6782	4.1814	39.7140	4.1928	39.7498	4.2041	39.7856
1960	4.2719	40.0000	4.2832	40.0357	4.2945	40.0714	4.3058	40.1071	4.3170	40.1428
1970	4.3847	40.3567	4.3959	40.3923	4.4072	40.4279	4.4185	40.4635	4.4297	40.4991
1980	4.4972	40.7125	4.5084	40.7480	4.5197	40.7835	4.5309	40.8190	4.5421	40.8545
1990	4.6094	41.0674	4.6206	41.1028	4.6318	41.1382	4.6430	41.1737	4.6542	41.2091
2000	4.7214	41.4214	4.7325	41.4567	4.7437	41.4920	4.7549	41.5274	4.7661	41.5627
2010	4.8330	41.7745	4.8442	41.8097	4.8553	41.8450	4.8665	41.8802	4.8776	41.9155
2020	4.9444	42.1267	4.9555	42.1619	4.9667	42.1970	4.9778	42.2322	4.9889	42.2674
2030	5.0555	42.4781	5.0666	42.5132	5.0777	42.5482	5.0888	42.5833	5.0999	42.6184
2040	5.1664	42.8286	5.1774	42.8636	5.1885	42.8986	5.1996	42.9336	5.2106	42.9685
2050	5.2769	43.1782	5.2880	43.2131	5.2990	43.2480	5.3100	43.2829	5.3211	43.3178
2060	5.3872	43.5270	5.3982	43.5618	5.4093	43.5967	5.4203	43.6315	5.4313	43.6663
2070	5.4973	43.8749	5.5082	43.9097	5.5192	43.9444	5.5302	43.9792	5.5412	44.0139
2080	5.6070	44.2221	5.6180	44.2567	5.6289	44.2914	5.6399	44.3260	5.6508	44.3607
2090	5.7165	44.5683	5.7275	44.6029	5.7384	44.6375	5.7493	44.6720	5.7602	44.7066
2100	5.8258	44.9138	5.8367	44.9483	5.8476	44.9828	5.8585	45.0172	5.8694	45.0517
2110	5.9347	45.2584	5.9456	45.2928	5.9565	45.3272	5.9674	45.3616	5.9783	45.3960
2120	6.0435	45.6022	6.0543	45.6365	6.0652	45.6709	6.0760	45.7052	6.0869	45.7395
2130	6.1519	45.9452	6.1628	45.9795	6.1736	46.0137	6.1844	46.0479	6.1952	46.0822
2140	6.2601	46.2874	6.2709	46.3216	6.2817	46.3557	6.2925	46.3899	6.3033	46.4240
2150	6.3681	46.6288	6.3789	46.6629	6.3897	46.6970	6.4004	46.7310	6.4112	46.7651
2160	6.4758	46.9694	6.4866	47.0034	6.4973	47.0374	6.5081	47.0714	6.5188	47.1054
2170	6.5833	47.3092	6.5940	47.3431	6.6047	47.3771	6.6154	47.4110	6.6262	47.4449
2180	6.6905	47.6482	6.7012	47.6821	6.7119	47.7159	6.7226	47.7498	6.7333	47.7836
2190	6.7974	47.9865	6.8081	48.0203	6.8188	48.0540	6.8295	48.0878	6.8402	48.1216
2200	6.9042	48.3240	6.9148	48.3577	6.9255	48.3914	6.9361	48.4251	6.9468	48.4587
2210	7.0106	48.6607	7.0213	48.6943	7.0319	48.7279	7.0425	48.7616	7.0532	48.7952
2220	7.1169	48.9966	7.1275	49.0302	7.1381	49.0637	7.1487	49.0973	7.1593	49.1308
2230	7.2229	49.3318	7.2335	49.3653	7.2440	49.3988	7.2546	49.4323	7.2652	49.4657
2240	7.3286	49.6663	7.3392	49.6997	7.3498	49.7331	7.3603	49.7665	7.3709	49.7999
2250	7.4342	50.0000	7.4447	50.0333	7.4552	50.0667	7.4658	50.1000	7.4763	50.1333
2260	7.5395	50.3330	7.5500	50.3662	7.5605	50.3995	7.5710	50.4327	7.5815	50.4659
2270	7.6445	50.6652	7.6550	50.6984	7.6655	50.7315	7.6760	50.7647	7.6865	50.7979
2280	7.7493	50.9967	7.7598	51.0298	7.7703	51.0629	7.7807	51.0960	7.7912	51.1291
2290	7.8539	51.3275	7.8644	51.3605	7.8748	51.3935	7.8853	51.4266	7.8957	51.4596
2300	7.9583	51.6575	7.9687	51.6905	7.9792	51.7234	7.9896	51.7564	8.0000	51.7893
2310	8.0625	51.9868	8.0729	52.0197	8.0833	52.0526	8.0937	52.0855	8.1041	52.1184
2320	8.1664	52.3155	8.1768	52.3483	8.1871	52.3811	8.1975	52.4139	8.2079	52.4467
2330	8.2701	52.6434	8.2804	52.6761	8.2908	52.7089	8.3011	52.7416	8.3115	52.7743
2340	8.3735	52.9706	8.3839	53.0033	8.3942	53.0359	8.4045	53.0686	8.4149	53.1013
	40+	100+	40+	100+	40+	100+	40+	100+	40+	100+

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
40+	100+	40+	100+	40+	100+	40+	100+	40+	100+	
3.6463	38.0217	3.6578	38.0580	3.6692	38.0942	3.6807	38.1304	3.6921	38.1666	1900
3.7607	38.3835	3.7721	38.4197	3.7836	38.4558	3.7950	38.4919	3.8064	38.5280	1910
3.8748	38.7444	3.8862	38.7804	3.8976	38.8164	3.9090	38.8524	3.9204	38.8884	1920
3.9886	39.1043	4.0000	39.1402	4.0114	39.1761	4.0227	39.2121	4.0341	39.2480	1930
4.1022	39.4633	4.1135	39.4991	4.1248	39.5349	4.1362	39.5708	4.1475	39.6066	1940
4.2154	39.8213	4.2267	39.8571	4.2380	39.8928	4.2493	39.9286	4.2606	39.9643	1950
4.3283	40.1785	4.3396	40.2141	4.3509	40.2498	4.3621	40.2854	4.3734	40.3211	1960
4.4410	40.5347	4.4522	40.5703	4.4635	40.6058	4.4747	40.6414	4.4860	40.6769	1970
4.5533	40.8900	4.5646	40.9255	4.5758	40.9610	4.5870	40.9965	4.5982	41.0319	1980
4.6654	41.2445	4.6766	41.2799	4.6878	41.3153	4.6990	41.3506	4.7102	41.3860	1990
4.7772	41.5980	4.7884	41.6333	4.7996	41.6686	4.8107	41.7039	4.8219	41.7392	2000
4.8888	41.9507	4.8999	41.9859	4.9110	42.0211	4.9222	42.0563	4.9333	42.0915	2010
5.0000	42.3025	5.0111	42.3376	5.0222	42.3728	5.0333	42.4079	5.0444	42.4430	2020
5.1110	42.6534	5.1221	42.6885	5.1331	42.7235	5.1442	42.7585	5.1553	42.7936	2030
5.2217	43.0035	5.2327	43.0385	5.2438	43.0734	5.2548	43.1084	5.2659	43.1433	2040
5.3321	43.3527	5.3431	43.3876	5.3542	43.4225	5.3652	43.4573	5.3762	43.4922	2050
5.4423	43.7011	5.4533	43.7359	5.4643	43.7707	5.4753	43.8054	5.4863	43.8402	2060
5.5522	44.0486	5.5631	44.0833	5.5741	44.1180	5.5851	44.1527	5.5961	44.1874	2070
5.6618	44.3953	5.6727	44.4299	5.6837	44.4645	5.6946	44.4991	5.7056	44.5337	2080
5.7712	44.7411	5.7821	44.7757	5.7930	44.8102	5.8039	44.8447	5.8148	44.8793	2090
5.8803	45.0862	5.8912	45.1206	5.9021	45.1551	5.9130	45.1895	5.9239	45.2240	2100
5.9891	45.4304	6.0000	45.4648	6.0109	45.4991	6.0217	45.5335	6.0326	45.5679	2110
6.0977	45.7738	6.1086	45.8081	6.1194	45.8424	6.1303	45.8767	6.1411	45.9109	2120
6.2061	46.1164	6.2169	46.1506	6.2277	46.1848	6.2385	46.2190	6.2493	46.2532	2130
6.3141	46.4582	6.3249	46.4923	6.3357	46.5264	6.3465	46.5606	6.3573	46.5947	2140
6.4220	46.7992	6.4327	46.8332	6.4435	46.8673	6.4543	46.9013	6.4650	46.9354	2150
6.5296	47.1394	6.5403	47.1734	6.5510	47.2073	6.5618	47.2413	6.5725	47.2753	2160
6.6369	47.4788	6.6476	47.5127	6.6583	47.5466	6.6690	47.5805	6.6798	47.6144	2170
6.7440	47.8175	6.7547	47.8513	6.7654	47.8851	6.7761	47.9189	6.7868	47.9527	2180
6.8508	48.1553	6.8615	48.1891	6.8722	48.2228	6.8828	48.2565	6.8935	48.2903	2190
6.9574	48.4924	6.9681	48.5261	6.9787	48.5598	6.9894	48.5934	7.0000	48.6271	2200
7.0638	48.8288	7.0744	48.8624	7.0850	48.8959	7.0956	48.9295	7.1063	48.9631	2210
7.1699	49.1643	7.1805	49.1979	7.1911	49.2314	7.2017	49.2649	7.2123	49.2984	2220
7.2758	49.4992	7.2864	49.5326	7.2969	49.5660	7.3075	49.5995	7.3181	49.6329	2230
7.3814	49.8332	7.3920	49.8666	7.4025	49.9000	7.4131	49.9333	7.4236	49.9667	2240
7.4868	50.1666	7.4974	50.1999	7.5079	50.2332	7.5184	50.2664	7.5289	50.2997	2250
7.5920	50.4992	7.6025	50.5324	7.6130	50.5656	7.6235	50.5988	7.6340	50.6320	2260
7.6970	50.8310	7.7074	50.8642	7.7179	50.8973	7.7284	50.9304	7.7389	50.9636	2270
7.8017	51.1622	7.8121	51.1952	7.8226	51.2283	7.8330	51.2614	7.8435	51.2944	2280
7.9062	51.4926	7.9166	51.5256	7.9270	51.5586	7.9375	51.5916	7.9479	51.6245	2290
8.0104	51.8223	8.0208	51.8552	8.0312	51.8881	8.0416	51.9210	8.0521	51.9539	2300
8.1144	52.1512	8.1248	52.1841	8.1352	52.2170	8.1456	52.2498	8.1560	52.2826	2310
8.2183	52.4795	8.2286	52.5123	8.2390	52.5451	8.2494	52.5778	8.2597	52.6106	2320
8.3218	52.8071	8.3322	52.8398	8.3425	52.8725	8.3529	52.9052	8.3632	52.9379	2330
8.4252	53.1339	8.4355	53.1666	8.4458	53.1992	8.4562	53.2319	8.4665	53.2645	2340
40+	100+	40+	100+	40+	100+	40+	100+	40+	100+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	40+	100+	40+	100+	40+	100+	40+	100+	40+	100+
2350	8.4768	53.2971	8.4871	53.3297	8.4974	53.3623	8.5077	53.3949	8.5180	53.4275
2360	8.5798	53.6229	8.5901	53.6555	8.6004	53.6880	8.6107	53.7205	8.6210	53.7530
2370	8.6826	53.9480	8.6929	53.9805	8.7032	54.0130	8.7134	54.0454	8.7237	54.0779
2380	8.7852	54.2725	8.7955	54.3049	8.8057	54.3373	8.8160	54.3697	8.8262	54.4021
2390	8.8876	54.5962	8.8979	54.6286	8.9081	54.6609	8.9183	54.6932	8.9285	54.7256
2400	8.9898	54.9193	9.0000	54.9516	9.0102	54.9839	9.0204	55.0161	9.0306	55.0484
2410	9.0918	55.2417	9.1019	55.2740	9.1121	55.3061	9.1223	55.3383	9.1325	55.3705
2420	9.1935	55.5635	9.2037	55.5956	9.2138	55.6278	9.2240	55.6599	9.2341	55.6920
2430	9.2950	55.8846	9.3052	55.9166	9.3153	55.9487	9.3255	55.9808	9.3356	56.0128
2440	9.3964	56.2050	9.4065	56.2370	9.4166	56.2690	9.4267	56.3010	9.4368	56.3330
2450	9.4975	56.5248	9.5076	56.5567	9.5177	56.5886	9.5278	56.6206	9.5379	56.6525
2460	9.5984	56.8439	9.6085	56.8757	9.6185	56.9076	9.6286	56.9395	9.6387	56.9713
2470	9.6991	57.1623	9.7092	57.1941	9.7192	57.2260	9.7293	57.2578	9.7393	57.2895
2480	9.7996	57.4802	9.8096	57.5119	9.8197	57.5436	9.8297	57.5754	9.8397	57.6071
2490	9,8999	57.7973	9.9099	57.8290	9.9199	57.8607	9.9300	57.8924	9.9400	57.9240
2500	*0.0000	58.1139	*0.0100	58.1455	*0.0200	58.1771	*0.0300	58.2087	*0.0400	58.2403
2510	0.0999	58.4298	0.1099	58.4614	0.1199	58.4929	0.1298	58.5244	0.1398	58.5560
2520	0.1996	58.7451	0.2096	58.7766	0.2195	58.8081	0.2295	58.8395	0.2394	58.8710
2530	0.2991	59.0597	0.3090	59.0912	0.3190	59.1226	0.3289	59.1540	0.3389	59.1854
2540	0.3984	59.3738	0.4083	59.4051	0.4183	59.4365	0.4282	59.4679	0.4381	59.4992
2550	0.4975	59.6872	0.5074	59.7185	0.5173	59.7498	0.5272	59.7811	0.5371	59.8124
2560	0.5964	60.0000	0.6063	60.0312	0.6162	60.0625	0.6261	60.0937	0.6360	60.1250
2570	0.6952	60.3122	0.7050	60.3434	0.7149	60.3746	0.7247	60.4057	0.7346	60.4369
2580	0.7937	60.6238	0.8035	60.6549	0.8134	60.6860	0.8232	60.7171	0.8331	60.7483
2590	0.8920	60.9348	0.9019	60.9658	0.9117	60.9969	0.9215	61.0279	0.9313	61.0590
2600	0.9902	61.2452	1.0000	61.2762	1.0098	61.3072	1.0196	61.3382	1.0294	61.3691
2610	1.0882	61.5549	1.0979	61.5859	1.1077	61.6168	1.1175	61.6478	1.1273	61.6787
2620	1.1859	61.8641	1.1957	61.8950	1.2055	61.9259	1.2152	61.9568	1.2250	61.9877
2630	1.2835	62.1727	1.2933	62.2036	1.3030	62.2344	1.3128	62.2652	1.3225	62.2960
2640	1.3809	62.4808	1.3907	62.5115	1.4004	62.5423	1.4101	62.5731	1.4198	62.6038
2650	1.4782	62.7882	1.4879	62.8189	1.4976	62.8496	1.5073	62.8803	1.5170	62.9110
2660	1.5752	63.0951	1.5849	63.1257	1.5946	63.1564	1.6043	63.1870	1.6140	63.2176
2670	1.6720	63.4013	1.6817	63.4319	1.6914	63.4625	1.7011	63.4931	1.7107	63.5237
2680	1.7687	63.7071	1.7784	63.7376	1.7880	63.7681	1.7977	63.7987	1.8073	63.8292
2690	1.8652	64.0122	1.8748	64.0427	1.8845	64.0732	1.8941	64.1036	1.9038	64.1341
2700	1.9615	64.3168	1.9711	64.3472	1.9808	64.3776	1.9904	64.4080	2.0000	64.4384
2710	2.0577	64.6208	2.0673	64.6511	2.0769	64.6815	2.0865	64.7119	2.0961	64.7422
2720	2.1536	64.9242	2.1632	64.9545	2.1728	64.9848	2.1824	65.0152	2.1920	65.0454
2730	2.2494	65.2271	2.2590	65.2574	2.2685	65.2876	2.2781	65.3179	2.2877	65.3481
2740	2,3450	65.5295	2.3546	65.5597	2.3641	65.5899	2.3737	65.6200	2.3832	65.6502
2750	2.4404	65.8312	2.4500	65.8614	2.4595	65.8915	2.4690	65.9217	2.4786	65.9518
2760	2.5357	66.1325	2.5452	66.1626	2.5547	66.1927	2.5642	66.2227	2.5738	66.2528
2770	2.6308	66.4332	2.6403	66.4632	2.6498	66.4932	2.6593	66.5233	2.6688	66.5533
2780	2.7257	66.7333	2.7352	66.7633	2.7447	66.7933	2.7541	66.8233	2.7636	66.8532
2790	2.8205	67.0329	2.8299	67.0629	2.8394	67.0928	2.8488	67.1227	2.8583	67.1526
	50+	100+	50+	100+	50+	100+	50+	100+	50+	100+

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
40+	100+	40+	100+	40+	100+	40+	100+	40+	100+	
8.5283	53.4601	8.5386	53.4927	8.5489	53.5252	8.5592	53.5578	8.5695	53.5904	2350
8.6313	53.7856	8.6415	53.8181	8.6518	53.8506	8.6621	53.8831	8.6724	53.9156	2360
8.7340	54.1104	8.7442	54.1428	8.7545	54.1752	8.7647	54.2077	8.7750	54.2401	2370
8.8365	54.4345	8.8467	54.4668	8.8569	54.4992	8.8672	54.5316	8.8774	54.5639	2380
8.9387	54.7579	8.9490	54.7902	8.9592	54.8225	8.9694	54.8548	8.9796	54.8871	2390
9.0408	55.0806	9.0510	55.1129	9.0612	55.1451	9.0714	55.1773	9.0816	55.2095	2400
9.1427	55.4027	9.1528	55.4349	9.1630	55.4670	9.1732	55.4992	9.1833	55.5313	2410
9.2443	55.7241	9.2544	55.7562	9.2646	55.7883	9.2747	55.8204	9.2849	55.8525	2420
9.3457	56.0449	9.3559	56.0769	9.3660	56.1089	9.3761	56.1410	9.3862	56.1730	2430
9.4469	56.3650	9.4571	56.3969	9.4672	56.4289	9.4773	56.4609	9.4874	56.4928	2440
9.5480	56.6844	9.5580	56.7163	9.5681	56.7482	9.5782	56.7801	9.5883	56.8120	2450
9.6488	57.0032	9.6588	57.0350	9.6689	57.0669	9.6790	57.0987	9.6890	57.1305	2460
9.7494	57.3213	9.7594	57.3531	9.7695	57.3849	9.7795	57.4166	9.7896	57.4484	2470
9.8498	57.6388	9.8598	57.6705	9.8698	57.7023	9.8799	57.7340	9.8899	57.7656	2480
9.9500	57.9557	9.9600	57.9873	9.9700	58.0190	9.9800	58.0506	9.9900	58.0823	2490
*0.0500	58.2719	*0.0600	58.3035	*0.0700	58.3351	*0.0799	58.3667	*0.0899	58.3982	2500
0.1498	58.5875	0.1597	58.6190	0.1697	58.6506	0.1797	58.6821	0.1896	58.7136	2510
0.2494	58.9025	0.2593	58.9339	0.2693	58.9654	0.2792	58.9969	0.2892	59.0283	2520
0.3488	59.2168	0.3587	59.2482	0.3686	59.2796	0.3786	59.3110	0.3885	59.3424	2530
0.4480	59.5306	0.4579	59.5619	0.4678	59.5932	0.4777	59.6246	0.4876	59.6559	2540
0.5470	59.8437	0.5569	59.8750	0.5668	59.9062	0.5767	59.9375	0.5866	59.9687	2550
0.6458	60.1562	0.6557	60.1874	0.6656	60.2186	0.6754	60.2498	0.6853	60.2810	2560
0.7445	60.4681	0.7543	60.4992	0.7642	60.5304	0.7740	60.5615	0.7839	60.5927	2570
0.8429	60.7794	0.8527	60.8104	0.8626	60.8415	0.8724	60.8726	0.8822	60.9037	2580
0.9411	61.0900	0.9510	61.1211	0.9608	61.1521	0.9706	61.1831	0.9804	61.2141	2590
1.0392	61.4001	1.0490	61.4311	1.0588	61.4621	1.0686	61.4930	1.0784	61.5240	2600
1.1371	61.7096	1.1468	61.7405	1.1566	61.7714	1.1664	61.8023	1.1762	61.8332	2610
1.2348	62.0185	1.2445	62.0494	1.2543	62.0802	1.2640	62.1111	1.2738	62.1419	2620
1.3323	62.3268	1.3420	62.3576	1.3517	62.3884	1.3615	62.4192	1.3712	62.4500	2630
1.4296	62.6346	1.4393	62.6653	1.4490	62.6960	1.4587	62.7268	1.4684	62.7575	2640
1.5267	62.9417	1.5364	62.9724	1.5461	63.0031	1.5558	63.0337	1.5655	63.0644	2650
1.6236	63.2483	1.6333	63.2789	1.6430	63.3095	1.6527	63.3401	1.6624	63.3707	2660
1.7204	63.5543	1.7301	63.5848	1.7397	63.6154	1.7494	63.6460	1.7591	63.6765	2670
1.8170	63.8597	1.8266	63.8902	1.8363	63.9207	1.8459	63.9512	1.8556	63.9817	2680
1.9134	64.1646	1.9230	64.1950	1.9326	64.2255	1.9423	64.2559	1.9519	64.2863	2690
2.0096	64.4688	2.0192	64.4992	2.0288	64.5296	2.0384	64.5600	2.0481	64.5904	2700
2.1057	64.7726	2.1153	64.8029	2.1249	64.8332	2.1344	64.8636	2.1440	64.8939	2710
2.2015	65.0757	2.2111	65.1060	2.2207	65.1363	2.2303	65.1666	2.2398	65.1969	2720
2.2972	65.3784	2.3068	65.4086	2.3163	65.4388	2.3259	65.4690	2.3355	65.4992	2730
2.3927	65.6804	2.4023	65.7106	2.4118	65.7408	2.4214	65.7709	2.4309	65.8011	2740
2.4881	65.9819	2.4976	66.0120	2.5071	66.0422	2.5167	66.0723	2.5262	66.1024	2750
2.5833	66.2829	2.5928	66.3130	2.6023	66.3430	2.6118	66.3731	2.6213	66.4031	2760
2.6783	66.5833	2.6878	66.6133	2.6972	66.6433	2.7067	66.6733	2.7162	66.7033	2770
2.7731	66.8832	2.7826	66.9132	2.7920	66.9431	2.8015	66.9731	2.8110	67.0030	2780
2.8678	67.1825	2.8772	67.2124	2.8867	67.2423	2.8961	67.2722	2.9056	67.3021	2790
50+	100+	50+	100+	50+	100+	50+	100+	50+	100+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	50+	100+	50+	100+	50+	100+	50+	100+	50+	100+
2800	2.9150	67.3320	2.9245	67.3619	2.9339	67.3918	2.9434	67.4216	2.9528	67.4515
2810	3.0094	67.6305	3.0189	67.6604	3.0283	67.6902	3.0377	67.7200	3.0471	67.7498
2820	3.1037	67.9286	3.1131	67.9583	3.1225	67.9881	3.1319	68.0179	3.1413	68.0476
2830	3.1977	68.2260	3.2071	68.2558	3.2165	68.2855	3.2259	68.3152	3.2353	68.3449
2840	3.2917	68.5230	3.3010	68.5527	3.3104	68.5823	3.3198	68.6120	3.3292	68.6416
2850	3.3854	68.8194	3.3948	68.8490	3.4041	68.8787	3.4135	68.9083	3.4228	68.9379
2860	3.4790	69.1153	3.4883	69.1449	3.4977	69.1745	3.5070	69.2040	3.5164	69.2336
2870	3.5724	69.4107	3.5817	69.4403	3.5910	69.4698	3.6004	69.4993	3.6097	69.5288
2880	3.6656	69.7056	3.6749	69.7351	3.6843	69.7645	3.6936	69.7940	3.7029	69.8234
2890	3.7587	70.0000	3.7680	70.0294	3.7773	70.0588	3.7866	70.0882	3.7959	70.1176
2900	3.8516	70.2939	3.8609	70.3232	3.8702	70.3526	3.8795	70.3819	3.8888	70.4113
2910	3.9444	70.5872	3.9537	70.6165	3.9630	70.6458	3.9722	70.6751	3.9815	70.7044
2920	4.0370	70.8801	4.0463	70.9093	4.0555	70.9386	4.0648	70.9678	4.0740	70.9971
2930	4.1295	71.1724	4.1387	71.2016	4.1479	71.2308	4.1572	71.2600	4.1664	71.2892
2940	4.2218	71.4643	4.2310	71.4934	4.2402	71.5226	4.2494	71.5517	4.2586	71.5809
2950	4.3139	71.7556	4.3231	71.7847	4.3323	71.8139	4.3415	71.8430	4.3507	71.8720
2960	4.4059	72.0465	4.4151	72.0756	4.4243	72.1046	4.4334	72.1337	4.4426	72.1627
2970	4.4977	72.3369	4.5069	72.3659	4.5161	72.3949	4.5252	72.4239	4.5344	72.4529
2980	4.5894	72.6268	4.5985	72.6557	4.6077	72.6847	4.6168	72.7136	4.6260	72.7426
2990	4.6809	72.9162	4.6900	72.9451	4.6992	72.9740	4.7083	73.0029	4.7175	73.0318
3000	4.7723	73.2051	4.7814	73.2339	4.7905	73.2628	4.7996	73.2917	4.8088	73.3205
3010	4.8635	73.4935	4.8726	73.5223	4.8817	73.5511	4.8908	73.5800	4.8999	73.6088
3020	4.9545	73.7815	4.9636	73.8102	4.9727	73.8390	4.9818	73.8678	4.9909	73.8965
3030	5.0454	74.0690	5.0545	74.0977	5.0636	74.1264	5.0727	74.1551	5.0818	74.1838
3040	5.1362	74.3560	5.1453	74.3846	5.1543	74.4133	5.1634	74.4420	5.1725	74.4706
3050	5.2268	74.6425	5.2359	74.6711	5.2449	74.6997	5.2540	74.7284	5.2630	74.7570
3060	5.3173	74.9286	5.3263	74.9571	5.3353	74.9857	5.3444	75.0143	5.3534	75.0429
3070	5.4076	75.2142	5.4166	75.2427	5.4256	75.2712	5.4346	75.2997	5.4437	75.3283
3080	5.4977	75.4993	5.5068	75.5278	5.5158	75.5563	5.5248	75.5847	5.5338	75.6132
3090	5.5878	75.7840	5.5968	75.8124	5.6058	75.8408	5.6147	75.8693	5.6237	75.8977
3100	5.6776	76.0682	5.6866	76.0966	5.6956	76.1250	5.7046	76.1533	5.7136	76.1817
3110	5.7674	76.3519	5.7763	76.3803	5.7853	76.4086	5.7943	76.4370	5.8032	76.4653
3120	5.8570	76.6352	5.8659	76.6635	5.8749	76.6918	5.8838	76.7201	5.8928	76.7484
3130	5.9464	76.9181	5.9553	76.9463	5.9643	76.9746	5.9732	77.0028	5.9821	77.0311
3140	6.0357	77.2005	6.0446	77.2287	6.0535	77.2569	6.0625	77.2851	6.0714	77.3133
3150	6.1249	77.4824	6.1338	77.5106	6.1427	77.5387	6.1516	77.5669	6.1605	77.5950
3160	6.2139	77.7639	6.2228	77.7920	6.2317	77.8201	6.2406	77.8483	6.2494	77.8764
3170	6.3028	78.0449	6.3116	78.0730	6.3205	78.1011	6.3294	78.1292	6.3383	78.1572
3180	6.3915	78.3255	6.4004	78.3536	6.4092	78.3816	6.4181	78.4096	6.4269	78.4377
3190	6.4801	78.6057	6.4889	78.6337	6.4978	78.6617	6.5066	78.6897	6.5155	78.7177
3200	6.5685	78.8854	6.5774	78.9134	6.5862	78.9413	6.5951	78.9693	6.6039	78.9972
3210	6.6569	79.1647	6.6657	79.1926	6.6745	79.2205	6.6833	79.2484	6.6922	79.2763
3220	6.7450	79.4436	6.7539	79.4714	6.7627	79.4993	6.7715	79.5272	6.7803	79.5550
3230	6.8331	79.7220	6.8419	79.7498	6.8507	79.7776	6.8595	79.8055	6.8683	79.8333
3240	6.9210	80.0000	6.9298	80.0278	6.9386	80.0555	6.9473	80.0833	6.9561	80.1111
	50+	100+	50+	100+	50+	100+	50+	100+	50+	100+

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
50+	100+	50+	100+	50+	100+	50+	100+	50+	100+	
2.9623	67.4813	2.9717	67.5112	2.9811	67.5410	2.9906	67.5709	3.0000	67.6007	2800
3.0566	67.7796	3.0660	67.8094	3.0754	67.8392	3.0848	67.8690	3.0943	67.8988	2810
3.1507	68.0774	3.1601	68.1071	3.1695	68.1368	3.1789	68.1666	3.1883	68.1963	2820
3.2447	68.3746	3.2541	68.4043	3.2635	68.4340	3.2729	68.4636	3.2823	68.4933	2830
3.3385	68.6713	3.3479	68.7009	3.3573	68.7306	3.3667	68.7602	3.3760	68.7898	2840
3.4322	68.9675	3.4416	68.9970	3.4509	69.0266	3.4603	69.0562	3.4696	69.0858	2850
3.5257	69.2631	3.5350	69.2926	3.5444	69.3222	3.5537	69.3517	3.5630	69.3812	2860
3.6190	69.5583	3.6284	69.5877	3.6377	69.6172	3.6470	69.6467	3.6563	69.6762	2870
3.7122	69.8529	3.7215	69.8823	3.7308	69.9117	3.7401	69.9412	3.7494	69.9706	2880
3.8052	70.1470	3.8145	70.1764	3.8238	70.2058	3.8331	70.2351	3.8424	70.2645	2890
3.8981	70.4406	3.9073	70.4699	3.9166	70.4993	3.9259	70.5286	3.9351	70.5579	2900
3.9907	70.7337	4.0000	70.7630	4.0093	70.7923	4.0185	70.8215	4.0278	70.8508	2910
4.0833	71.0263	4.0925	71.0555	4.1018	71.0848	4.1110	71.1140	4.1202	71.1432	2920
4.1756	71.3184	4.1849	71.3476	4.1941	71.3768	4.2033	71.4060	4.2125	71.4351	2930
4.2679	71.6100	4.2771	71.6392	4.2863	71.6683	4.2955	71.6974	4.3047	71.7265	2940
4.3599	71.9011	4.3691	71.9302	4.3783	71.9593	4.3875	71.9884	4.3967	72.0174	2950
4.4518	72.1918	4.4610	72.2208	4.4702	72.2498	4.4794	72.2788	4.4885	72.3079	2960
4.5436	72.4819	4.5527	72.5109	4.5619	72.5399	4.5711	72.5688	4.5802	72.5978	2970
4.6352	72.7715	4.6443	72.8005	4.6535	72.8294	4.6626	72.8583	4.6717	72.8872	2980
4.7266	73.0607	4.7357	73.0896	4.7449	73.1185	4.7540	73.1473	4.7631	73.1762	2990
4.8179	73.3494	4.8270	73.3782	4.8361	73.4070	4.8452	73.4359	4.8544	73.4647	3000
4.9090	73.6376	4.9181	73.6663	4.9272	73.6951	4.9363	73.7239	4.9454	73.7527	3010
5.0000	73.9253	5.0091	73.9540	5.0182	73.9828	5.0273	74.0115	5.0364	74.0402	3020
5.0908	74.2125	5.0999	74.2412	5.1090	74.2699	5.1181	74.2986	5.1271	74.3273	3030
5.1815	74.4993	5.1906	74.5279	5.1996	74.5566	5.2087	74.5852	5.2178	74.6139	3040
5.2721	74.7856	5.2811	74.8142	5.2901	74.8428	5.2992	74.8714	5.3082	74.9000	3050
5.3624	75.0714	5.3715	75.1000	5.3805	75.1285	5.3895	75.1571	5.3986	75.1856	3060
5.4527	75.3568	5.4617	75.3853	5.4707	75.4138	5.4797	75.4423	5.4887	75.4708	3070
5.5428	75.6417	5.5518	75.6701	5.5608	75.6986	5.5698	75.7271	5.5788	75.7555	3080
5.6327	75.9261	5.6417	75.9545	5.6507	75.9830	5.6597	76.0114	5.6687	76.0398	3090
5.7225	76.2101	5.7315	76.2385	5.7405	76.2668	5.7494	76.2952	5.7584	76.3236	3100
5.8122	76.4936	5.8211	76.5220	5.8301	76.5503	5.8391	76.5786	5.8480	76.6069	3110
5.9017	76.7767	5.9106	76.8050	5.9196	76.8333	5.9285	76.8615	5.9375	76.8898	3120
5.9911	77.0593	6.0000	77.0875	6.0089	77.1158	6.0179	77.1440	6.0268	77.1722	3130
6.0803	77.3415	6.0892	77.3697	6.0981	77.3979	6.1070	77.4260	6.1160	77.4542	3140
6.1694	77.6232	6.1783	77.6513	6.1872	77.6795	6.1961	77.7076	6.2050	77.7358	3150
6.2583	77.9045	6.2672	77.9326	6.2761	77.9607	6.2850	77.9888	6.2939	78.0169	3160
6.3471	78.1853	6.3560	78.2134	6.3649	78.2414	6.3738	78.2695	6.3826	78.2975	3170
6.4358	78.4657	6.4447	78.4937	6.4535	78.5217	6.4624	78.5497	6.4712	78.5777	3180
6.5243	78.7456	6.5332	78.7736	6.5420	78.8016	6.5509	78.8295	6.5597	78.8575	3190
6.6127	79.0251	6.6216	79.0531	6.6304	79.0810	6.6392	79.1089	6.6480	79.1368	3200
6.7010	79.3042	6.7098	79.3321	6.7186	79.3600	6.7274	79.3878	6.7362	79.4157	3210
6.7891	79.5829	6.7979	79.6107	6.8067	79.6385	6.8155	79.6664	6.8243	79.6942	3220
6.8771	79.8611	6.8859	79.8889	6.8946	79.9166	6.9034	79.9444	6.9122	79.9722	3230
6.9649	80.1388	6.9737	80.1666	6.9825	80.1943	6.9912	80.2221	7.0000	80.2498	3240
50+	100+	50+	100+	50+	100+	50+	100+	50+	100+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	50+	100+	50+	100+	50+	100+	50+	100+	50+	100+
3250	7.0088	80.2776	7.0175	80.3053	7.0263	80.3330	7.0351	80.3608	7.0438	80.3885
3260	7.0964	80.5547	7.1052	80.5824	7.1139	80.6101	7.1227	80.6378	7.1314	80.6654
3270	7.1839	80.8314	7.1927	80.8591	7.2014	80.8867	7.2101	80.9143	7.2189	80.9420
3280	7.2713	81.1077	7.2800	81.1353	7.2887	81.1629	7.2975	81.1905	7.3062	81.2181
3290	7.3585	81.3836	7.3672	81.4111	7.3760	81.4387	7.3847	81.4663	7.3934	81.4938
3300	7.4456	81.6590	7.4543	81.6866	7.4630	81.7141	7.4717	81.7416	7.4804	81.7691
3310	7.5326	81.9341	7.5413	81.9615	7.5500	81.9890	7.5587	82.0165	7.5674	82.0440
3320	7.6194	82.2087	7.6281	82.2361	7.6368	82.2635	7.6455	82.2910	7.6541	82.3184
3330	7.7062	82.4829	7.7148	82.5103	7.7335	82.5377	7,7321	82.5651	7.7408	82.5924
3340	7.7927	82.7567	7.8014	82.7840	7.8100	82.8114	7.8187	82.8387	7.8273	82.8661
3350	7.8792	83.0301	7.8878	83.0574	7.8965	83.0847	7.9051	83.1120	7.9137	83.1393
3360	7.9655	83.3030	7.9741	83.3303	7.9828	83.3576	7.9914	83.3848	8.0000	83.4121
3370	8.0517	83.5756	8.0603	83.6028	8.0689	83.6301	8.0775	83.6573	8.0861	83.6845
3380	8.1378	83.8478	8.1464	83.8750	8.1550	83.9021	8.1636	83.9293	8.1722	83.9565
3390	8.2237	84.1195	8.2323	84.1467	8.2409	84.1738	8.2495	84.2010	8.2580	84.2281
3400	8.3095	84.3909	8.3181	84.4180	8.3267	84.4451	8.3352	84.4722	8.3438	84.4993
3410	8.3952	84.6619	8.4038	84.6889	8.4123	84.7160	8.4209	84.7431	8.4294	84.7701
3420	8.4808	84.9324	8.4893	84.9595	8.4979	84.9865	8.5064	85.0135	8.5150	85.0405
3430	8.5662	85.2026	8.5747	85.2296	8.5833	85.2566	8.5918	85.2836	8.6003	85.3106
3440	8.6515	85.4724	8.6600	85.4993	8,6686	85.5263	8.6771	85.5532	8.6856	85.5802
3450	8.7367	85.7418	8.7452	85.7687	8.7537	85.7956	8.7622	85.8225	8.7707	85.8494
3460	8.8218	86.0108	8.8303	86.0376	8.8388	86.0645	8.8473	86.0914	8.8558	86.1182
3470	8.9067	86.2794	8.9152	86.3062	8.9237	86.3330	8.9322	86.3599	8.9406	86.3867
3480	8.9915	86.5476	9.0000	86.5744	9.0085	86.6012	9.0169	86.6280	9.0254	86.6548
3490	9.0762	86.8154	9.0847	86.8422	9.0931	86.8689	9.1016	86.8957	9.1101	86.9224
3500	9.1608	87.0829	9.1693	87.1096	9.1777	87.1363	9.1861	87.1630	9.1946	87.1897
3510	9.2453	87.3499	9.2537	87.3766	9.2621	87.4033	9.2706	87.4300	9.2790	87.4567
3520	9.3296	87.6166	9.3380	87.6433	9.3464	87.6699	9.3549	87.6966	9.3633	87.7232
3530	9.4138	87.8829	9.4222	87.9096	9.4306	87.9362	9.4390	87.9628	9.4475	87.9894
3540	9.4979	88.1489	9.5063	88.1755	9.5147	88.2020	9.5231	88.2286	9.5315	88.2551
3550	9.5819	88.4144	9.5903	88.4410	9.5987	88.4675	9.6070	88.4940	9.6154	88.5206
3560	9.6657	88.6796	9.6741	88.7061	9.6825	88.7326	9.6909	88.7591	9.6992	88.7856
3570	9.7495	88.9444	9.7578	88.9709	9.7662	88.9974	9.7746	89.0238	9.7829	89.0503
3580	9.8331	89.2089	9.8415	89.2353	9.8498	89.2617	9.8582	89.2881	9.8665	89.3146
3590	9.9166	89.4730	9.9250	89.4993	9.9333	89.5257	9.9416	89.5521	9.9500	89.5785
3600	*0.0000	89.7367	*0.0083	89.7630	*0.0167	89.7894	*0.0250	89.8157	*0.0333	89.8420
3610	0.0833	90.0000	0.0916	90.0263	0.0999	90.0526	0.1082	90.0789	0.1166	90.1052
3620	0.1664	90.2630	0.1747	90.2893	0.1831	90.3155	0.1914	90.3418	0.1997	90.3681
3630	0.2495	90.5256	0.2578	90.5518	0.2661	90.5781	0.2744	90.6043	0.2827	90.6305
3640	0.3324	90.7878	0.3407	90.8140	0.3490	90.8402	0.3573	90.8664	0.3656	90.8926
3650	0.4152	91.0497	0.4235	91.0759	0.4318	91.1021	0.4401	91.1282	0.4483	91.1544
3660	0.4979	91.3113	0.5062	91.3374	0.5145	91.3635	0.5227	91.3897	0.5310	91.4158
3670	0.5805	91.5724	0.5888	91.5985	0.5970	91.6246	0.6053	91.6507	0.6135	91.6768
3680	0.6630	91.8333	0.6712	91.8593	0.6795	91.8854	0.6877	91.9114	0.6960	91.9375
3690	0.7454	92.0937	0.7536	92.1198	0.7618	92.1458	0.7701	92.1718	0.7783	92.1978
	60+	100+	60+	100+	60+	100+	60+	100+	60+	100+

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
50+	100+	50+	100+	50+	100+	50+	100+	50+	100+	
7.0526	80.4162	7.0614	80.4439	7.0701	80.4716	7.0789	80.4993	7.0877	80.5270	3250
7.1402	80.6931	7.1489	80.7208	7.1577	80.7484	7.1664	80.7761	7.1752	80.8038	3260
7.2276	80.9696	7.2364	80.9972	7.2451	81.0249	7.2538	81.0525	7.2626	81.0801	3270
7.3149	81.2457	7.3236	81.2733	7.3324	81.3009	7.3411	81.3284	7.3498	81.3560	3280
7.4021	81.5213	7.4108	81.5489	7.4195	81.5764	7.4282	81.6040	7.4369	81.6315	3290
7.4891	81.7966	7.4978	81.8241	7.5065	81.8516	7.5152	81.8791	7.5239	81.9066	3300
7.5760	82.0714	7.5847	82.0989	7.5934	82.1263	7.6021	82.1538	7.6108	82.1812	3310
7.6628	82.3458	7.6715	82.3732	7.6802	82.4007	7.6888	82.4281	7.6975	82.4555	3320
7.7495	82.6198	7.7581	82.6472	7.7668	82.6746	7.7754	82.7019	7.7841	82.7293	3330
7.8360	82.8934	7.8446	82.9207	7.8533	82.9481	7.8619	82.9754	7.8705	83.0027	3340
7.9224	83.1666	7.9310	83.1939	7.9396	83.2212	7.9483	83.2485	7.9569	83.2757	3350
8.0086	83.4394	8.0172	83.4666	8.0259	83.4939	8.0345	83.5211	8.0431	83.5484	3360
8.0948	83.7117	8.1034	83.7389	8.1120	83.7662	8.1206	83.7934	8.1292	83.8206	3370
8.1808	83.9837	8.1893	84.0109	8.1979	84.0380	8.2065	84.0652	8.2151	84.0924	3380
8.2666	84.2553	8.2752	84.2824	8.2838	84.3095	8.2924	84.3366	8.3009	84.3638	3390
8.3524	84.5264	8.3609	84.5535	8.3695	84.5806	8.3781	94.6077	8.3866	84.6348	3400
8.4380	84.7972	8.4466	84.8242	8.4551	84.8513	8.4637	84.8783	8.4722	84.9054	3410
8.5235	85.0676	8.5320	85.0946	8.5406	85.1216	8.5491	85.1486	8.5577	85.1756	3420
8.6089	85.3375	8.6174	85.3645	8.6259	85.3915	8.6345	85.4184	8.6430	85.4454	3430
8.6941	85.6071	8.7026	85.6340	8.7112	85.6610	8.7197	85.6879	8.7282	85.7148	3440
8.7792	85.8763	8.7878	85.9032	8.7963	85.9301	8.8048	85.9570	8.8133	85.9839	3450
8.8643	86.1451	8.8727	86.1720	8.8812	86.1988	8.8897	86.2257	8.8982	86.2525	3460
8.9491	86.4135	8.9576	86.4403	8.9661	86.4672	8.9746	86.4940	8.9830	86.5208	3470
9.0339	86.6815	9.0424	86.7083	9.0508	86.7351	9.0593	86.7619	9.0678	86.7887	3480
9.1185	86.9492	9.1270	86.9759	9.1354	87.0027	9.1439	87.0294	9.1523	87.0561	3490
9.2030	87.2165	9.2115	87.2431	9.2199	87.2699	9.2284	87.2966	9.2368	87.3233	3500
9.2874	87.4833	9.2959	87.5100	9.3043	87.5367	9.3127	87.5633	9.3212	87.5900	3510
9.3717	87.7498	9.3801	87.7765	9.3886	87.8031	9.3970	87.8297	9.4054	87.8563	3520
9.4559	88.0159	9.4643	88.0425	9.4727	88.0691	9.4811	88.0957	9.4895	88.1223	3530
9.5399	88.2817	9.5483	88.3083	9.5567	88.3348	9.5651	88.3614	9.5735	88.3879	3540
9.6238	88.5471	9.6322	88.5736	9.6406	88.6001	9.6490	88.6266	9.6574	88.6531	3550
9.7076	88.8121	9.7160	88.8386	9.7244	88.8650	9.7327	88.8915	9.7411	88.9180	3560
9.7913	89.0767	9.7997	89.1031	9.8080	89.1296	9.8164	89.1560	9.8247	89.1825	3570
9.8749	89.3410	9.8832	89.3674	9.8916	89.3938	9.8999	89.4202	9.9083	89.4466	3580
9.9583	89.6049	9.9667	89.6312	9.9750	89.6576	9.9833	89.6839	9.9917	89.7103	3590
0.0417	89.8684	*0.0500	89.8947	*0.0583	89.9210	*0.0666	89.9474	*0.0750	89.9737	3600
0.1249	90.1315	0.1332	90.1578	0.1415	90.1841	0.1498	90.2104	0.1581	90.2367	3610
0.2080	90.3943	0.2163	90.4206	0.2246	90.4468	0.2329	90.4731	0.2412	90.4993	3620
0.2910	90.6568	0.2993	90.6830	0.3075	90.7092	0.3158	90.7354	0.3241	90.7616	3630
0.3738	90.9188	0.3821	90.9450	0.3904	90.9712	0.3987	90.9974	0.4070	91.0236	3640
0.4566	91.1805	0.4649	91.2067	0.4731	91.2328	0.4814	91.2590	0.4897	91.2851	3650
0.5392	91.4419	0.5475	91.4680	0.5558	91.4941	0.5640	91.5202	0.5723	91.5463	3660
0.6218	91.7029	0.6300	91.7290	0.6383	91.7551	0.6465	91.7811	0.6548	91.8072	3670
0.7042	91.9635	0.7124	91.9896	0.7207	92.0156	0.7289	92.0417	0.7371	92.0677	3680
0.7865	92.2238	0.7947	92.2498	0.8030	92.2758	0.8112	92.3018	0.8194	92.3278	3690
60+	100+	60+	100+	60+	100+	60+	100+	60+	100+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	60+	100+	60+	100+	60+	100+	60+	100+	60+	100+
3700	0.8276	92.3538	0.8358	92.3798	0.8441	92.4058	0.8523	92.4318	0.8605	92.4578
3710	0.9098	92.6136	0.9180	92.6396	0.9262	92.6655	0.9344	92.6915	0.9426	92.7174
3720	0.9918	92.8730	1.0000	92.8989	1.0082	92.9249	1.0164	92.9508	1.0246	92.9767
3730	1.0737	93.1321	1.0819	93.1580	1.0901	93.1839	1.0983	93.2097	1.1065	93.2356
3740	1.1555	93.3908	1.1637	93.4166	1.1719	93.4425	1.1801	93.4683	1.1882	93.4942
3750	1.2372	93.6492	1.2454	93.6750	1.2536	93.7008	1.2617	93.7266	1.2699	93.7524
3760	1.3188	93.9072	1.3270	93.9330	1.3351	93.9588	1.3433	93.9845	1.3514	94.0103
3770	1.4003	94.1649	1.4085	94.1906	1.4166	94.2164	1.4248	94.2421	1.4329	94.2679
3780	1.4817	94.4222	1.4898	94.4479	1.4980	94.4736	1.5061	94.4994	1.5142	94.5251
3790	1.5630	94.6792	1.5711	94.7049	1.5792	94.7306	1.5873	94.7563	1.5955	94.7819
3800	1.6441	94.9359	1.6523	94.9615	1.6604	94.9872	1.6685	95.0128	1.6766	95.0385
3810	1.7252	95.1922	1.7333	95.2178	1.7414	95.2434	1.7495	95.2690	1.7576	95.2946
3820	1.8061	95.4482	1.8142	95.4738	1.8223	95.4994	1.8304	95.5249	1.8385	95.5505
3830	1.8870	95.7039	1.8951	95.7294	1.9032	95.7549	1.9112	95.7805	1.9193	95.8060
3840	1.9677	95.9592	1.9758	95.9847	1.9839	96.0102	1.9919	96.0357	2.0000	96.0612
3850	2.0484	96.2142	2.0564	96.2396	2.0645	96.2651	2.0725	96.2906	2.0806	96.3161
3860	2.1289	96.4688	2.1369	96.4943	2.1450	96.5197	2.1530	96.5452	2.1611	96.5706
3870	2.2093	96.7232	2.2174	96.7486	2.2254	96.7740	2.2334	96.7994	2.2415	96.8248
3880	2.2896	96.9772	2.2977	97.0025	2.3057	97.0279	2.3137	97.0533	2.3217	97.0787
3890	2.3699	97.2308	2.3779	97.2562	2.3859	97.2816	2.3939	97.3069	2.4019	97.3322
3900	2.4500	97.4842	2.4580	97.5095	2.4660	97.5348	2.4740	97.5601	2.4820	97.5854
3910	2.5300	97.7372	2.5380	97.7625	2.5460	97.7878	2.5540	97.8130	2.5620	97.8383
3920	2.6099	97.9899	2.6179	98.0152	2.6259	98.0404	2.6339	98.0656	2.6418	98.0909
3930	2.6897	98.2423	2.6977	98.2675	2.7057	98.2927	2.7136	98.3179	2.7216	98.3431
3940	2.7694	98.4943	2.7774	98.5195	2.7853	98.5447	2.7933	98.5699	2.8013	98.5951
3950	2.8490	98.7461	2.8570	98.7712	2.8649	98.7964	2.8729	98.8215	2.8808	98.8467
3960	2.9285	98.9975	2.9365	99.0226	2.9444	99.0477	2.9524	99.0729	2.9603	99.0980
3970	3.0079	99.2486	3.0159	99.2737	3.0238	99.2988	3.0317	99.3239	3.0397	99.3489
3980	3.0872	99.4994	3.0952	99.5244	3.1031	99.5495	3.1110	99.5745	3.1189	99.5996
3990	3.1664	99.7498	3.1744	99.7749	3.1823	99.7999	3.1902	99.8249	3.1981	99.8499
4000	3.2456	*0.0000	3.2535	*0.0250	3.2614	*0.0500	3.2693	*0.0750	3.2772	*0.1000
4010	3.3246	0.2498	3.3325	0.2748	3.3404	0.2998	3.3482	0.3247	3.3561	0.3497
4020	3.4035	0.4994	3.4114	0.5243	3.4192	0.5492	3.4271	0.5742	3.4350	0.5991
4030	3.4823	0.7486	3.4902	0.7735	3.4980	0.7984	3.5059	0.8233	3.5138	0.8482
4040	3.5610	0.9975	3.5689	1.0224	3.5767	1.0473	3.5846	1.0721	3.5925	1.0970
4050	3.6396	1.2461	3.6475	1.2710	3.6553	1.2958	3.6632	1.3206	3.6710	1.3455
4060	3.7181	1.4944	3.7260	1.5192	3.7338	1.5440	3.7417	1.5688	3.7495	1.5937
4070	3.7966	1.7424	3.8044	1.7672	3.8122	1.7920	3.8201	1.8167	3.8279	1.8415
4080	3.8749	1.9901	3.8827	2.0149	3.8905	2.0396	3.8984	2.0643	3.9062	2.0891
4090	3.9531	2.2375	3.9609	2.2622	3.9687	2.2869	3.9766	2.3116	3.9844	2.3364
4100	4.0312	2.4846	4.0391	2.5093	4.0469	2.5339	4.0547	2.5586	4.0625	2.5833
4110	4.1093	2.7313	4.1171	2.7560	4.1249	2.7807	4.1327	2.8053	4.1405	2.8300
4120	4.1872	2.9778	4.1950	3.0025	4.2028	3.0271	4.2106	3.0517	4.2184	3.0763
4130	4.2651	3.2240	4.2729	3.2486	4.2806	3.2732	4.2884	3.2978	4.2962	3.3224
4140	4.3428	3.4699	4.3506	3.4945	4.3584	3.5190	4.3661	3.5436	4.3739	3.5682
	60+	200+	60+	200+	60+	200+	60+	200+	60+	200+

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
60+	100+	60+	100+	60+	100+	60+	100+	60+	100+	
0.8687	92.4838	0.8769	92.5097	0.8851	92.5357	0.8933	92.5617	0.9016	92.5876	3700
0.9508	92.7434	0.9590	92.7693	0.9672	92.7952	0.9754	92.8212	0.9836	92.8471	3710
1.0328	93.0026	1.0410	93.0285	1.0492	93.0544	1.0574	93.0803	1.0655	93.1062	3720
1.1146	93.2615	1.1228	93.2874	1.1310	93.3132	1.1392	93.3391	1.1474	93.3649	3730
1.1964	93.5200	1.2046	93.5459	1.2127	93.5717	1.2209	93.5975	1.2291	93.6233	3740
1.2781	93.7782	1.2862	93.8040	1.2944	93.8298	1.3025	93.8556	1.3107	93.8814	3750
1.3596	94.0361	1.3677	94.0618	1.3759	94.0876	1.3840	94.1134	1.3922	94.1391	3760
1.4410	94.2936	1.4492	94.3193	1.4573	94.3451	1.4654	94.3708	1.4736	94.3965	3770
1.5224	94.5508	1.5305	94.5765	1.5386	94.6022	1.5467	94.6279	1.5549	94.6535	3780
1.6036	94.8076	1.6117	94.8333	1.6198	94.8589	1.6279	94.8846	1.6360	94.9102	3790
1.6847	95.0641	1.6928	95.0897	1.7009	95.1154	1.7090	95.1410	1.7171	95.1666	3800
1.7657	95.3203	1.7738	95.3458	1.7819	95.3714	1.7900	95.3970	1.7981	95.4226	3810
1.8466	95.5761	1.8547	95.6016	1.8628	95.6272	1.8708	95.6528	1.8789	95.6783	3820
1.9274	95.8316	1.9355	95.8571	1.9435	95.8826	1.9516	95.9081	1.9597	95.9337	3830
2.0081	96.0867	2.0161	96.1122	2.0242	96.1377	2.0323	96.1632	2.0403	96.1887	3840
2.0886	96.3415	2.0967	96.3670	2.1048	96.3925	2.1128	96.4179	2.1209	96.4434	3850
2.1691	96.5960	2.1772	96.6215	2.1852	96.6469	2.1932	96.6723	2.2013	96.6977	3860
2.2495	96.8502	2.2575	96.8756	2.2656	96.9010	2.2736	96.9264	2.2816	96.9518	3870
2.3298	97.1040	2.3378	97.1294	2.3458	97.1548	2.3538	97.1801	2.3618	97.2055	3880
2.4099	97.3575	2.4179	97.3829	2.4260	97.4082	2.4340	97.4335	2.4420	97.4589	3890
2.4900	97.6107	2.4980	97.6360	2.5060	97.6613	2.5140	97.6866	2.5220	97.7119	3900
2.5700	97.8636	2.5780	97.8889	2.5859	97.9141	2.5939	97.9394	2.6019	97.9646	3910
2.6498	98.1161	2.6578	98.1414	2.6658	98,1666	2.6738	98.1918	2.6817	98.2171	3920
2.7296	98.3683	2.7375	98.3935	2.7455	98.4187	2.7535	98.4439	2.7615	98.4691	3930
2.8092	98.6202	2.8172	98.6454	2.8252	98.6706	2.8331	98.6957	2.8411	98.7209	3940
2.8888	98.8718	2.8967	98.8970	2.9047	98.9221	2.9126	98.9472	2.9206	98.9724	3950
2.9682	99.1231	2.9762	99.1482	2.9841	99.1733	2.9921	99.1984	3.0000	99.2235	3960
3.0476	99.3740	3.0555	99.3991	3.0635	99.4242	3.0714	99.4492	3.0793	99.4743	3970
3.1269	99.6246	3.1348	99.6497	3.1427	99.6747	3.1506	99.6998	3.1585	99.7248	3980
3.2060	99.8750	3.2139	99.9000	3.2218	99.9250	3.2297	99.9500	3.2376	99.9750	3990
3.2851	*0.1250	3.2930	*0.1499	3.3009	*0.1749	3.3088	*0.1999	3.3167	*0.2249	4000
3.3640	0.3746	3.3719	0.3996	3.3798	0.4245	3.3877	0.4495	3.3956	0.4744	4010
3.4429	0.6240	3.4508	0.6489	3.4586	0.6739	3.4665	0.6988	3.4744	0.7237	4020
3.5217	0.8731	3.5295	0.8980	3.5374	0.9229	3.5453	0.9478	3.5531	0.9726	4030
3.6003	1.1219	3.6082	1.1467	3.6160	1.1716	3.6239	1.1964	3.6318	1.2213	4040
3.6789	1.3703	3.6867	1.3951	3.6946	1.4200	3.7024	1.4448	3.7103	1.4696	4050
3.7574	1.6185	3.7652	1.6432	3.7730	1.6680	3.7809	1.6928	3.7887	1.7176	4060
3.8357	1.8663	3.8436	1.8911	3.8514	1.9158	3,8592	1.9406	3.8670	1.9653	4070
3.9140	2.1138	3.9218	2.1386	3.9296	2.1633	3.9375	2.1880	3.9453	2.2128	4080
3.9922	2.3611	4.0000	2.3858	4.0078	2.4105	4.0156	2.4352	4.0234	2.4599	4090
4.0703	2.6080	4.0781	2.6327	4.0859	2.6573	4.0937	2.6820	4.1015	2.7067	4100
4.1483	2.8546	4.1561	2.8793	4.1639	2.9039	4.1716	2.9286	4.1794	2.9532	4110
4.2262	3.1010	4.2339	3.1256	4.2417	3.1502	4.2495	3.1748	4.2573	3.1994	4120
4.3040	3.3470	4.3117	3.3716	4.3195	3.3962	4.3273	3.4207	4.3351	3.4453	4130
4.3817	3.5927	4.3894	3.6173	4.3972	3.6418	4.4050	3.6664	4.4127	3.6909	4140
60+	200+	60+	200+	60+	200+	60+	200+	60+	200+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	60+	200+	60+	200+	60+	200+	60+	200+	60+	200+
4150	4.4205	3.7155	4.4283	3.7400	4.4360	3.7646	4.4438	3.7891	4.4515	3.8136
4160	4.4981	3.9608	4.5058	3.9853	4.5136	4.0098	4.5213	4.0343	4.5291	4.0588
4170	4.5755	4.2058	4.5833	4.2303	4.5910	4.2547	4.5988	4.2792	4.6065	4.3037
4180	4.6529	4.4505	4.6607	4.4749	4.6684	4.4994	4.6761	4.5238	4.6838	4.5483
4190	4.7302	4.6949	4.7379	4.7193	4.7457	4.7437	4.7534	4.7682	4.7611	4.7926
4200	4.8074	4.9390	4.8151	4.9634	4.8228	4.9878	4.8305	5.0122	4.8383	5.0366
4210	4.8845	5.1828	4.8922	5.2072	4.8999	5.2316	4.9076	5.2559	4.9153	5.2803
4220	4.9615	5.4264	4.9692	5.4507	4.9769	5.4751	4.9846	5.4994	4.9923	5.5237
4230	5.0385	5.6696	5.0461	5.6939	5.0538	5.7183	5.0615	5.7426	5.0692	5.7669
4240	5.1153	5.9126	5.1230	5.9369	5.1306	5.9612	5.1383	5.9854	5.1460	6.0097
4250	5.1920	6.1553	5.1997	6.1795	5.2074	6.2038	5.2150	6.2280	5.2227	6.2523
4260	5.2687	6.3977	5.2763	6.4219	5.2840	6.4461	5.2917	6.4703	5.2993	6.4946
4270	5.3452	6.6398	5.3529	6.6640	5.3605	6.6882	5.3682	6.7124	5.3758	6.7365
4280	5.4217	6.8816	5.4294	6.9058	5.4370	6.9299	5.4446	6.9541	5.4523	6.9783
4290	5.4981	7.1232	5.5057	7.1473	5.5134	7.1714	5.5210	7.1956	5.5286	7.2197
4300	5.5744	7.3644	5.5820	7.3885	5.5896	7.4126	5.5973	7.4367	5.6049	7.4608
4310	5.6506	7.6054	5.6582	7.6295	5.6658	7.6536	5.6734	7.6776	5.6810	7.7017
4320	5.7267	7.8461	5.7343	7.8702	5.7419	7.8942	5.7495	7.9183	5.7571	7.9423
4330	5.8027	8.0865	5.8103	8.1105	5.8179	8.1346	5.8255	8.1586	5.8331	8.1826
4340	5.8787	8.3267	5.8863	8.3507	5.8939	8.3747	5.9014	8.3987	5.9090	8.4226
4350	5.9545	8.5665	5.9621	8.5905	5.9697	8.6145	5.9773	8.6384	5.9848	8.6624
4360	6.0303	8.8061	6.0379	8.8301	6.0454	8.8540	6.0530	8.8780	6.0606	8.9019
4370	6.1060	9.0455	6.1135	9.0694	6.1211	9.0933	6.1287	9.1172	6.1362	9.1411
4380	6.1816	9.2845	6.1891	9.3084	6.1967	9.3323	6.2042	9.3562	6.2118	9.3800
4390	6.2571	9.5233	6.2646	9.5471	6.2722	9.5710	6.2797	9.5948	6.2873	9.6187
4400	6.3325	9.7618	6.3400	9.7856	6.3476	9.8094	6.3551	9.8333	6.3626	9.8571
4410	6.4078	10.0000	6.4154	10.0238	6.4229	10.0476	6.4304	10.0714	6.4379	10.0952
4420	6.4831	10.2380	6.4906	10.2617	6.4981	10.2855	6.5056	10.3093	6.5132	10.3331
4430	6.5582	10.4757	6.5658	10.4994	6.5733	10.5232	6.5808	10.5469	6.5883	10.5707
4440	6.6333	10.7131	6.6408	10.7368	6.6483	10.7605	6.6558	10.7843	6.6633	10.8080
4450	6.7083	10.9502	6.7158	10.9739	6.7233	10.9976	6.7308	11.0213	6.7383	11.0450
4460	6.7832	11.1871	6.7907	11.2108	6.7982	11.2345	6.8057	11.2581	6.8132	11.2818
4470	6.8581	11.4237	6.8655	11.4474	6.8730	11.4710	6.8805	11.4947	6.8880	11.5183
4480	6.9328	11.6601	6.9403	11.6837	6.9477	11.7073	6.9552	11.7310	6.9627	11.7546
4490	7.0075	11.8962	7.0149	11.9198	7.0224	11.9434	7.0298	11.9670	7.0373	11.9906
4500	7.0820	12.1320	7.0895	12.1556	7.0969	12.1792	7.1044	12.2027	7.1118	12.2263
4510	7.1565	12.3676	7.1640	12.3911	7.1714	12.4147	7.1789	12.4382	7.1863	12.4618
4520	7.2309	12.6029	7.2384	12.6264	7.2458	12.6499	7.2533	12.6735	7.2607	12.6970
4530	7.3053	12.8380	7.3127	12.8615	7.3201	12.8849	7.3276	12.9084	7.3350	12.9319
4540	7.3795	13.0728	7.3869	13.0962	7.3944	13.1197	7.4018	13.1431	7.4092	13.1666
4550	7.4537	13.3073	7.4611	13.3307	7.4685	13.3542	7.4759	13.3776	7.4833	13.4010
4560	7.5278	13.5416	7.5352	13.5650	7.5426	13.5884	7.5500	13.6118	7.5574	13.6352
4570	7.6018	13.7756	7.6092	13.7990	7.6166	13.8224	7.6240	13.8457	7.6314	13.8691
4580	7.6757	14.0093	7.6831	14.0327	7.6905	14.0561	7.6979	14.0794	7.7052	14.1028
4590	7.7495	14.2429	7.7569	14.2662	7.7643	14.2895	7.7717	14.3129	7.7791	14.3362
	60+	200+	60+	200+	60+	200+	60+	200+	60+	200+

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
60+	200+	60+	200+	60+	200+	60+	200+	60+	200+	
4.4593	3.8382	4.4670	3.8627	4.4748	3.8872	4.4826	3.9117	4.4903	3.9363	4150
4.5368	4.0833	4.5446	4.1078	4.5523	4.1323	4.5601	4.1568	4.5678	4.1813	4160
4.6142	4.3282	4.6220	4.3526	4.6297	4.3771	4.6375	4.4016	4.6452	4.4260	4170
4.6916	4.5727	4.6993	4.5972	4.7070	4.6216	4.7148	4.6460	4.7225	4.6705	4180
4.7688	4.8170	4.7765	4.8414	4.7843	4.8658	4.7920	4.8902	4.7997	4.9146	4190
4.8460	5.0610	4.8537	5.0853	4.8614	5.1097	4.8691	5.1341	4.8768	5.1585	4200
4.9230	5.3047	4.9307	5.3290	4.9384	5.3534	4.9461	5.3777	4.9538	5.4020	4210
5.0000	5.5480	5.0077	5.5724	5.0154	5.5967	5.0231	5.6210	5.0308	5.6453	4220
5.0769	5.7912	5.0846	5.8155	5.0922	5.8397	5.0999	5.8640	5.1076	5.8883	4230
5.1537	6.0340	5.1613	6.0582	5.1690	6.0825	5.1767	6.1068	5.1844	6.1310	4240
5.2304	6.2765	5.2380	6.3008	5.2457	6.3250	5.2534	6.3492	5.2610	6.3734	4250
5.3070	6.5188	5.3146	6.5430	5.3223	6.5672	5.3299	6.5914	5.3376	6.6156	4260
5.3835	6.7607	5.3911	6.7849	5.3988	6.8091	5.4064	6.8333	5.4141	6.8574	4270
5.4599	7.0024	5.4675	7.0266	5.4752	7.0507	5.4828	7.0749	5.4905	7.0990	4280
5.5363	7.2438	5.5439	7.2679	5.5515	7.2921	5.5591	7.3162	5.5668	7.3403	4290
5.6125	7.4849	5.6201	7.5090	5.6277	7.5331	5.6354	7.5572	5.6430	7.5813	4300
5.6887	7.7258	5.6963	7.7499	5.7039	7.7739	5.7115	7.7980	5.7191	7.8220	4310
5.7647	7.9663	5.7723	7.9904	5.7799	8.0144	5.7875	8.0385	5.7951	8.0625	4320
5.8407	8.2066	5.8483	8.2306	5.8559	8.2547	5.8635	8.2787	5.8711	8.3027	4330
5.9166	8.4466	5.9241	8.4706	5.9318	8.4946	5.9394	8.5186	5.9469	8.5426	4340
5.9924	8.6864	6.0000	8.7103	6.0076	8.7343	6.0152	8.7582	6.0227	8.7822	4350
6.0681	8.9258	6.0757	8.9498	6.0833	8.9737	6.0908	8.9976	6.0984	9.0215	4360
6.1438	9.1650	6.1513	9.1889	6.1589	9.2128	6.1665	9.2367	6.1740	9.2606	4370
6.2193	9.4039	6.2269	9.4278	6.2344	9.4517	6.2420	9.4755	6.2495	9.4994	4380
6.2948	8.6426	6.3023	9.6664	6.3099	9.6902	6.3174	9.7141	6.3250	9.7379	4390
6.3702	9.8809	6.3777	9.9047	6.3852	9.9286	6.3928	9.9524	6.4003	9.9762	4400
6.4455	10.1190	6.4530	10.1428	6.4605	10.1666	6.4680	10.1904	6.4756	10.2142	4410
6.5207	10.3568	6.5282	10.3806	6.5357	10.4044	6.5432	10.4281	6.5507	10.4519	4420
6.5958	10.5944	6.6033	10.6181	6.6108	10.6419	6.6183	10.6656	6.6258	10.6893	4430
6.6708	10.8317	6.6783	10.8554	6.6858	10.8791	6.6933	10.9028	6.7008	10.9265	4440
6.7458	11.0687	6.7533	11.0924	6.7608	11.1161	6.7683	11.1398	6.7757	11.1634	4450
6.8207	11.3055	6.8281	11.3291	6.8356	11.3528	6.8431	11.3764	6.8506	11.4001	4460
6.8954	11.5420	6.9029	11.5656	6.9104	11.5892	6.9179	11.6129	6.9253	11.6365	4470
6.9701	11.7782	6.9776	11.8018	6.9851	11.8254	6.9925	11.8490	7.0000	11.8726	4480
7.0448	12.0142	7.0522	12.0377	7.0597	12.0613	7.0671	12.0849	7.0746	12.1085	4490
7.1193	12.2499	7.1267	12.2734	7.1342	12.2970	7.1416	12.3205	7.1491	12.3441	4500
7.1938	12.4853	7.2012	12.5088	7.2086	12.5324	7.2161	12.5559	7.2235	12.5794	4510
7.2681	12.7205	7.2756	12.7440	7.2830	12.7675	7.2904	12.7910	7.2978	12.8145	4520
7.3424	12.9554	7.3498	12.9789	7.3573	13.0023	7.3647	12.0258	7.3721	13.0493	4530
7.4166	13.1901	7.4240	13.2135	7.4314	13.2370	7.4389	13.2604	7.4463	13.2838	4540
7.4907	13.4245	7.4981	13.4479	7.5056	13.4713	7.5130	13.4947	7.5204	13.5181	4550
7.5648	13.6586	7.5722	13.6820	7.5796	13.7054	7.5870	13.7288	7.5944	13.7522	4560
7.6387	13.8925	7.6461	13.9159	7.6535	13.9392	7.6609	13.9626	7.6683	13.9860	4570
7.7126	14.1261	7.7200	14.1495	7.7274	14.1728	7.7348	14.1962	7.7422	14.2195	4580
7.7864	14.3595	7.7938	14.3828	7.8012	14.4062	7.8086	14.4295	7.8159	14.4528	4590
60+	200+	60+	200+	60+	200+	60+	200+	60+	200+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	60+	200+	60+	200+	60+	200+	60+	200+	60+	200+
4600	7.8233	14.4761	7.8307	14.4994	7.8380	14.5227	7.8454	14.5460	7.8528	14.5693
4610	7.8970	14.7091	7.9043	14.7324	7.9117	14.7557	7.9191	14.7790	7.9264	14.8022
4620	7.9706	14.9419	7.9779	14.9651	7.9853	14.9884	7.9926	15.0116	8.0000	15.0349
4630	8.0441	15.1743	8.0515	15.1976	8.0588	15.2208	8.0661	15.2440	8.0735	15.2673
4640	8.1175	15.4066	8.1249	15.4298	8.1322	15.4530	8.1396	15.4762	8.1469	15.4994
4650	8.1909	15.6386	8.1982	15.6618	8.2056	15.6850	8.2129	15.7081	8.2202	15.7313
4660	8.2642	15.8703	8.2715	15.8935	8.2788	15.9167	8.2862	15.9398	8.2935	15.9630
4670	8.3374	16.1018	8.3447	16.1250	8.3520	16.1481	8.3593	16.1712	8.3667	16.1944
4680	8.4105	16.3331	8.4178	16.3562	8.4251	16.3793	8.4324	16.4024	8.4398	16.4255
4690	8.4836	16.5641	8.4909	16.5872	8.4982	16.6102	8.5055	16.6333	8.5128	16.6564
4700	8.5565	16.7948	8.5638	16.8179	8.5711	16.8410	8.5784	16.8640	8.5857	16.8871
4710	8.6294	17.0253	8.6367	17.0484	8.6440	17.0714	8.6513	17.0944	8.6586	17.1175
4720	8.7022	17.2556	8.7095	17.2786	8.7168	17.3016	8.7241	17.3446	8.7314	17.3476
4730	8.7750	17.4856	8.7823	17.5086	8.7895	17.5316	8.7968	17.5546	8.8041	17.5776
4740	8.8477	17.7154	8.8549	17.7384	8.8622	17.7613	8.8694	17.7843	8.8767	17.8073
4750	8.9202	17.9449	8.9275	17.9679	8.9348	17.9908	8.9420	18.0138	8.9493	18.0367
4760	8.9928	18.1742	9.0000	18.1972	9.0072	18.2201	9.0145	18.2430	9.0217	18.2659
4770	9.0652	18.4033	9.0724	18.4262	9.0797	18.4491	9.0869	18.4720	9.0941	18.4949
4780	9.1375	18.6321	9.1448	18.6550	9.1520	18.6778	9.1592	18.7007	9.1665	18.7236
4790	9.2098	18.8607	9.2171	18.8835	9.2243	19.9064	9.2315	18.9292	9.2387	18.9521
4800	9.2820	19.0890	9.2892	19.1118	9.2965	19.1347	9.3037	19.1575	9.3109	19.1803
4810	9.3542	19.3171	9.3614	19.3399	9.3686	19.3627	9.3758	19.3855	9.3830	19.4083
4820	9.4262	19.5450	9.4334	19.5678	9.4406	19.5905	9.4478	19.6133	9.4550	19.6361
4830	9.4982	19.7726	9.5054	19.7954	9.5126	19.8181	9.5198	19.8409	9.5270	19.8636
4840	9.5701	20.0000	9.5773	20.0227	9.5845	20.0455	9.5917	20.0682	9.5989	20.0909
4850	9.6419	20.2272	9.6491	20.2499	9.6563	20.2726	9.6635	20.2953	9.6707	20.3180
4860	9.7137	20.4541	9.7209	20.4768	9.7280	20.4994	9.7352	20.5221	9.7424	20.5448
4870	9.7854	20.6808	9.7926	20.7034	9.7997	20.7261	9.8069	20.7487	9.8140	20.7714
4880	9.8570	20.9072	9.8642	20.9299	9.8713	20.9525	9.8785	20.9751	9.8856	20.9977
4890	9.9285	21.1334	9.9357	21.1561	9.9428	21.1787	9.9500	21.2013	9.9571	21.2239
4900	*0.0000	21.3594	*0.0071	21.3820	*0.0143	21.4046	*0.0214	21.4272	*0.0286	21.4498
4910	0.0714	21.5852	0.0785	21.6078	0.0857	21.6303	0.0928	21.6529	0.0999	21.6754
4920	0.1427	21.8107	0.1498	21.8333	0.1570	21.8558	0.1641	21.8783	0.1712	21.9009
4930	0.2140	22.0360	0.2211	22.0586	0.2282	22.0811	0.2353	22.1036	0.2424	22.1261
4940	0.2851	22.2611	0.2922	22.2836	0.2994	22.3061	0.3065	22.3286	0.3136	22.3511
4950	0.3562	22.4860	0.3633	22.5084	0.3704	22.5309	0.3776	22.5534	0.3847	22.5758
4960	0.4273	22.7106	0.4344	22.7330	0.4415	22.7555	0.4486	22.7779	0.4557	22.8004
4970	0.4982	22.9350	0.5053	22.9574	0.5124	22.9798	0.5195	23.0022	0.5266	23.0247
4980	0.5691	23.1591	0.5762	23.1815	0.5833	23.2039	0.5904	23.2263	0.5975	23.2487
4990	0.6399	23.3831	0.6470	23.4055	0.6541	23.4278	0.6612	23.4502	0.6682	23.4726
5000	0.7107	23.6068	0.7177	23.6292	0.7248	23.6515	0.7319	23.6739	0.7390	23.6962
5010	0.7814	23.8303	0.7884	23.8526	0.7955	23.8750	0.8025	23.8973	0.8096	23.9196
5020	0.8520	24.0536	0.8590	24.0759	0.8661	24.0982	0.8731	24.1205	0.8802	24.1428
5030	0.9225	24.2766	0.9295	24.2989	0.9366	24.3212	0.9436	24.3435	0.9507	24.3658
5040	0.9930	24.4994	1.0000	24.5217	1.0070	24.5440	1.0141	24.5662	1.0211	24.5885
	70+	200+	70+	200+	70+	200+	70+	200+	70+	200+

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
60+	200+	60+	200+	60+	200+	60+	200+	60+	200+	
7.8602	14.5926	7.8675	14.6159	7.8749	14.6392	7.8823	14.6625	7.8896	14.6858	4600
7.9338	14.8255	7.9412	14.8488	7.9485	14.8721	7.9559	14.8953	7.9632	14.9186	4610
8.0074	15.0581	8.0147	15.0814	8.0221	15.1046	8.0294	15.1279	8.0368	15.1511	4620
8.0808	15.2905	8.0882	15.3137	8.0955	15.3369	8.1029	15.3602	8.1102	15.3834	4630
8.1542	15.5226	8.1616	15.5458	8.1689	15.5690	8.1762	15.5922	8.1836	15.6154	4640
8.2276	15.7546	8.2349	15.7777	8.2422	15.8008	8.2495	15.8240	8.2569	15.8472	4650
8.3008	15.9861	8.3081	16.0093	8.3154	16.0324	8.3228	16.0555	8.3301	16.0787	4660
8.3740	16.2175	8.3813	16.2406	8.3886	16.2637	8.3959	16.2868	8.4032	16.3100	4670
8.4471	16.4486	8.4544	16.4717	8.4617	16.4948	8.4690	16.5179	8.4763	16.5410	4680
8.5201	16.6795	8.5274	16.7026	8.5347	16.7256	8.5420	16.7487	8.5493	16.7718	4690
8.5930	16.9101	8.6003	16.9332	8.6076	16.9562	8.6149	16.9793	8.6222	17.0023	4700
8.6659	17.1405	8.6731	17.1635	8.6804	17.1866	8.6877	17.2096	8.6950	17.2326	4710
8.7386	17.3707	8.7459	17.3937	8.7532	17.4167	8.7605	17.4396	8.7677	17.4626	4720
8.8113	17.6006	8.8186	17.6235	8.8259	17.6465	8.8331	17.6695	8.8404	17.6924	4730
8.8840	17.8302	8.8912	17.8532	8.8985	17.8761	8.9057	17.8991	8.9130	17.9220	4740
8.9565	18.0596	8.9638	18.0826	8.9710	18.1055	8.9783	18.1284	8.9855	18.1513	4750
9.0290	18.2888	9.0362	18.3117	9.0435	18.3346	9.0507	18.3575	9.0579	18.3804	4760
9.1014	18.5177	9.1086	18.5406	9.1158	18.5635	9.1231	18.5864	9.1303	18.6092	4770
9.1737	18.7464	9.1809	18.7693	9.1881	18.7921	9.1954	18.8150	9.2026	18.8378	4780
9.2459	16.9749	9.2532	18.9977	9.2604	19.0205	9.2676	19.0434	9.2748	19.0662	4790
9.3181	19.2031	9.3253	19.2259	9.3325	19.2487	9.3397	19.2715	9.3470	19.2943	4800
9.3902	19.4311	9.3974	19.4539	9.4046	19.4767	9.4118	19.4994	9.4190	19.5222	4810
9.4622	19.6588	9.4694	19.6816	9.4766	19.7043	9.4838	19.7271	9.4910	19.7499	4820
9.5342	19.8863	9.5414	19.9091	9.5485	19.9318	9.5557	19.9545	9.5629	19.9773	4830
9.6060	20.1136	9.6132	20.1363	9.6204	20.1590	9.6276	20.1817	9.6348	20.2045	4840
9.6778	20.3406	9.6850	20.3633	9.6922	20.3860	9.6994	20.4087	9.7065	20.4314	4850
9.7496	20.5675	9.7567	20.5901	9.7639	20.6128	9.7711	20.6354	9.7782	20.6581	4860
9.8212	20.7940	9.8284	20.8167	9.8355	20.8393	9.8427	20.8619	9.8498	20.8846	4870
9.8928	21.0204	9.8999	21.0430	9.9071	21.0656	9.9142	21.0882	9.9214	21.1108	4880
9.9643	21.2465	9.9714	21.2691	9.9786	21.2917	9.9857	21.3143	9.9929	21.3368	4890
0.0357	21.4723	*0.0428	21.4949	*0.0500	21.5175	*0.0571	21.5401	*0.0643	21.5626	4900
0.1071	21.6980	0.1142	21.7205	0.1213	21.7431	0.1285	21.7656	0.1356	21.7882	4910
0.1783	21.9234	0.1855	21.9459	0.1926	21.9685	0.1997	21.9910	0.2068	22.0135	4920
0.2496	22.1486	0.2567	22.1711	0.2638	22.1936	0.2709	22.2161	0.2780	22.2386	4930
0.3207	22.3736	0.3278	22.3960	0.3349	22.4185	0.3420	22.4410	0.3491	22.4635	4940
0.3918	22.5983	0.3989	22.6208	0.4060	22.6432	0.4131	22.6657	0.4202	22.6981	4950
0.4628	22.8228	0.4699	22.8452	0.4769	22.8677	0.4840	22.8901	0.4911	22.9125	4960
0.5337	23.0471	0.5408	23.0695	0.5479	23.0919	0.5549	23.1143	0.5620	23.1367	4970
0.6045	23.2711	0.6116	23.2935	0.6187	23.3159	0.6258	23.3383	0.6329	23.3607	4980
0.6753	23.4950	0.6824	23.5173	0.6895	23.5397	0.6965	23.5621	0.7036	23.5844	4990
0.7460	23.7186	0.7531	23.7409	0.7602	23.7633	0.7672	23.7856	0.7743	23.8080	5000
0.8167	23.9420	0.8237	23.9643	0.8308	23.9866	0.8378	24.0089	0.8449	24.0312	5010
0.8872	24.1651	0.8943	24.1874	0.9013	24.2097	0.9084	24.2320	0.9154	24.2543	5020
0.9577	24.3881	0.9648	24.4103	0.9718	24.4326	0.9789	24.4549	0.9859	24.4772	5030
1.0282	24.6108	1.0352	24.6330	1.0422	24.6553	1.0493	24.6775	1.0563	24.6998	5040
70+	200+	70+	200+	70+	200+	70+	200+	70+	200+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	70+	200+	70+	200+	70+	200+	70+	200+	70+	200+
5050	1.0634	24.7221	1.0704	24.7443	1.0774	24.7665	1.0845	24.7888	1.0915	24.8110
5060	1.1337	24.9444	1.1407	24.9667	1.1477	24.9889	1.1548	25.0111	1.1618	25.0333
5070	1.2039	25.1666	1.2110	25.1888	1.2180	25.2110	1.2250	25.2332	1.2320	25.2554
5080	1.2741	25.3886	1.2811	25.4107	1.2881	25.4329	1.2952	25.4551	1.3022	25.4773
5090	1.3442	25.6103-	1.3512	25.6324	1.3583	25.6546	1.3653	25.6768	1.3723	25.6989
5100	1.4143	25.8318	1.4213	25.8539	1.4283	25.8761	1.4353	25.8982	1.4423	25.9203
5110	1.4843	26.0531	1.4913	26.0752	1.4983	26.0973	1.5052	26.1194	1.5122	26.1415
5120	1.5542	26.2742	1.5612	26.2963	1.5681	26.3184	1.5751	26.3405	1.5821	26.3625
5130	1.6240	26.4950	1.6310	26.5171	1.6380	26.5392	1.6450	26.5613	1.6519	26.5933
5140	1.6938	26.7157	1.7008	26.7377	1.7077	26.7598	1.7147	26.7818	1.7217	26.8039
5150	1.7635	26.9361	1.7705	26.9581	1.7774	26.9802	1.7844	27.0022	1.7914	27.0242
5160	1.8331	27.1563	1.8401	27.1783	1.8471	27.2004	1.8540	27.2224	1.8610	27.2444
5170	1.9027	27.3763	1.9097	27.3983	1.9166	27.4203	1.9236	27.4423	1.9305	27.4643
5180	1.9722	27.5961	1.9792	27.6181	1.9861	27.6401	1.9931	27.6620	2.0000	27.6840
5190	2.0417	27.8157	2.0486	27.8377	2.0555	27.8596	2.0625	27.8815	2.0694	27.9035
5200	2.1110	28.0351	2.1180	28.0570	2.1249	28.0789	2.1318	28.1009	2.1388	28.1228
5210	2.1803	28.2542	2.1873	28.2761	2.1942	28.2981	2.2011	28.3200	2.2080	28.3418
5220	2.2496	28.4732	2.2565	28.4951	2.2634	28.5170	2.2703	28.5388	2.2772	28.5607
5230	2.3187	28.6919	2.3257	28.7138	2.3226	28.7357	2.3395	28.7575	2.3464	28.7794
5240	2.3878	28.9105	2.3948	28.9323	2.4017	28.9541	2.4086	28.9760	2.4155	28.9978
5250	2.4569	29.1288	2.4638	29.1506	2.4707	29.1724	2.4776	29.1942	2.4845	29.2161
5260	2.5259	29.3469	2.5328	29.3687	2.5396	29.3905	2.5465	29.4123	2.5534	29.4341
5270	2.5948	29.5648	2.6017	29.5866	2.6085	29.6084	2.6154	29.6301	2.6223	29.6519
5280	2.6636	29.7825	2.6705	29.8043	2.6774	29.8260	2.6842	29.8478	2.6911	29.8695
5290	2.7324	30.0000	2.7393	30.0217	2.7461	30.0435	2.7530	30.0652	2.7599	30.0869
5300	2.8011	30.2173	2.8080	30.2390	2.8148	30.2607	2.8217	30.2824	2.8286	30.3041
5310	2.8697	30.4344	2.8766	30.4561	2.8835	30.4778	2.8903	30.4995	2.8972	30.5211
5320	2.9383	30.6513	2.9452	30.6729	2.9520	30.6946	2.9589	30.7163	2.9657	30.7379
5330	3.0068	30.8679	3.0137	30.8896	3.0205	30.9112	3.0274	30.9329	3.0342	30.9545
5340	3.0753	31.0844	3.0821	31.1060	3.0890	31.1277	3.0958	31.1493	3.1027	31.1709
5350	3.1437	31.3007	3.1505	31.3223	3.1574	31.3439	3.1642	31.3655	3.1710	31.3871
5360	3.2120	31.5167	3.2189	31.5383	3.2257	31.5599	3.2325	31.5815	3.2393	31.6031
5370	3.2803	31.7326	3.2871	31.7542	3.2939	31.7758	3.3008	31.7973	3.3076	31.8189
5380	3.3485	31.9483	3.3553	31.9698	3.3621	31.9914	3.3689	32.0129	3.3757	32.0345
5390	3.4166	32.1637	3.4234	32.1853	3.4302	32.2068	3.4370	32.2283	3.4439	32.2499
5400	3.4847	32.3790	3.4915	32.4005	3.4983	32.4220	3.5051	32.4435	3.5119	32.4651
5410	3.5527	32.5941	3.5595	32.6156	3.5663	32.6371	3.5731	32.6585	3.5799	32.6800
5420	3.6206	32.8089	3.6274	32.8304	3.6342	32.8519	3.6410	32.8734	3.6478	32.8948
5230	3.6885	33.0236	3.6953	33.0451	3.7021	33.0665	3.7089	33.0880	3.7157	33.1094
5440	3.7564	33.2381	3.7631	33.2595	3.7699	33.2809	3.7767	33.3024	3.7835	33.3238
5450	3.8241	33.4524	3.8309	33.4738	3.8377	33.4952	3.8444	33.5166	3.8512	33.5380
5460	3.8918	33.6664	3.8986	33.6878	3.9053	33.7092	3.9121	33.7306	3.9189	33.7520
5470	3.9594	33.8803	3.9662	33.9017	3.9730	33.9231	3.9797	33.9444	3.9865	33.9658
5480	4.0270	34.0940	4.0338	34.1154	4.0405	34.1367	4.0473	34.1581	4.0540	34.1794
5490	4.0945	34.3075	4.1013	34.3288	4.1080	34.3502	4.1148	34.3715	4.1215	34.3928
	70+	200+	70+	200+	70+	200+	70+	200+	70+	200+

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
70+	200+	70+	200+	70+	200+	70+	200+	70+	200+	
1.0985	24.8333	1.1056	24.8555	1.1126	24.8777	1.1196	24.9000	1.1266	24.9222	5050
1.1688	25.0555	1.1758	25.0778	1.1829	25.1000	1.1899	25.1222	1.1969	25.1444	5060
1.2390	25.2776	1.2461	25.2998	1.2531	25.3220	1.2601	25.3442	1.2671	25.3664	5070
1.3092	25.4994	1.3162	25.5216	1.3232	25.5438	1.3302	25.5660	1.3372	25.5881	5080
1.3793	25.7211	1.3863	25.7432	1.3933	25.7654	1.4003	25.7875	1.4073	25.8097	5090
1.4493	25.9425	1.4563	25.9646	1.4633	25.9867	1.4703	26.0088	1.4773	26.0310	5100
1.5192	26.1637	1.5262	26.1858	1.5332	26.2079	1.5402	26.2300	1.5472	26.2521	5110
1.5891	26.3846	1.5961	26.4067	1.6031	26.4288	1.6101	26.4509	1.6170	26.4730	5120
1.6589	26.6054	1.6659	26.6274	1.6729	26.6495	1.6798	26.6716	1.6868	26.6936	5130
1.7287	26.8259	1.7356	26.8480	1.7426	26.8700	1.7496	26.8920	1.7565	26.9141	5140
1.7983	27.0463	1.8053	27.0683	1.8123	27.0903	1.8192	27.1123	1.8262	27.1343	5150
1.8679	27.2664	1.8749	27.2884	1.8818	27.3104	1.8888	27.3324	1.8958	27.3543	5160
1.9375	27.4863	1.9444	27.5082	1.9514	27.5302	1.9583	27.5522	1.9653	27.5742	5170
2.0069	27.7060	2.0139	27.7279	2.0208	27.7499	2.0278	27.7718	2.0347	27.7938	5180
2.0763	27.9254	2.0833	27.9474	2.0902	27.9693	2.0972	27.9912	2.1041	28.0132	5190
2.1457	28.1447	2.1526	28.1666	2.1595	28.1885	2.1665	28.2104	2.1734	28.2323	5200
2.2150	28.3637	2.2219	28.3856	2.2288	28.4075	2.2357	28.4294	2.2426	28.4513	5210
2.2842	28.5826	2.2911	28.6045	2.2980	28.6263	2.3049	28.6482	2.3118	28.6701	5220
2.3533	28.8012	2.3602	28.8231	2.3671	28.8449	2.3740	28.8668	2.3809	28.8886	5230
2.4224	29.0197	2.4293	29.0415	2.4362	29.0633	2.4431	29.0851	2.4500	29.1070	5240
2.4914	29.2379	2.4983	29.2597	2.5052	29.2815	2.5121	29.3033	2.5190	29.3251	5250
2.5603	29.4559	2.5672	29.4777	2.5741	29.4995	2.5810	29.5212	2.5879	29.5430	5260
2.6292	29.6737	2.6361	29.6955	2.6430	29.7172	2.6498	29.7390	2.6567	29.7607	5270
2.6980	29.8913	2.7049	29.9130	2.7118	29.9348	2.7186	29.9565	2.7255	29.9783	5280
2.7668	30.1087	2.7736	30.1304	2.7805	30.1521	2.7874	30.1738	2.7942	30.1956	5290
2.8354	30.3259	2.8423	30.3476	2.8492	30.3693	2.8560	30.3910	2.8629	30.4127	5300
2.9040	30.5428	2.9109	30.5645	2.9178	30.5862	2.9246	30.6079	2.9315	30.6296	5310
2.9726	30.7596	2.9794	30.7813	2.9863	30.8029	2.9932	30.8246	3.0000	30.8463	5320
3.0411	30.9762	3.0479	30.9978	3.0548	31.0195	3.0616	31.0411	3.0685	31.0628	5330
3.1095	31.1926	3.1163	31.2142	3.1232	31.2358	3.1300	31.2574	3.1369	31.2791	5340
3.1779	31.4087	3.1847	31.4303	3.1915	31.4519	3.1984	31.4735	3.2052	31.4951	5350
3.2462	31.6247	3.2530	31.6463	3.2598	31.6679	3.2666	31.6894	3.2735	31.7110	5360
3.3144	31.8405	3.3212	31.8620	3.3280	31.8836	3.3348	31.9052	3.3417	31.9267	5370
3.3826	32.0560	3.3894	32.0776	3.3962	32.0991	3.4030	32.1207	3.4098	32.1422	5380
3.4507	32.2714	3.4575	32.2929	3.4643	32.3144	3.4711	32.3360	3.4779	32.3575	5390
3.5187	32.4866	3.5255	32.5081	3.5323	32.5296	3.5391	32.5511	3.5459	32.5726	5400
3.5867	32.7015	6.5935	32.7230	3.6003	32.7445	3.6071	32.7660	3.6139	32.7875	5410
3.6546	32.9163	3.6614	32.9378	3.6682	32.9592	3.6750	32.9807	3.6817	33.0021	5420
3.7225	33.1309	3.7292	33.1523	3.7360	33.1738	3.7428	33.1952	3.7496	33.2166	5230
3.7902	33.3452	3.7970	33.3667	3.8038	33.3881	3.8106	33.4095	3.8173	33.4309	5440
3.8580	33.5594	3.8647	33.5808	3.8715	33.6022	3.8783	33.6236	3.8850	33.6450	5450
3,9256	33.7734	3.9324	33.7948	3.9392	33.8162	3.9459	33.8376	3.9527	33.8589	5460
3.9932	33.9872	4.0000	34.0085	4.0068	34.0299	4.0135	34.0513	4.0203	34.0726	5470
4.0608	34.2008	4.0675	34.2221	4.0743	34.2435	4.0810	34.2648	4.0878	34.2862	5480
4.1283	34.4142	4.1350	34.4355	4.1418	34.4568	4.1485	34.4781	4.1552	34.4995	5490
70+	200+	70+	200+	70+	200+	70+	200+	70+	200+	

SQUARE ROOTS

N	0 $\sqrt{N}$	0 $\sqrt{10N}$	1 $\sqrt{N}$	1 $\sqrt{10N}$	2 $\sqrt{N}$	2 $\sqrt{10N}$	3 $\sqrt{N}$	3 $\sqrt{10N}$	4 $\sqrt{N}$	4 $\sqrt{10N}$
	70+	200+	70+	200+	70+	200+	70+	200+	70+	200+
5500	4.1620	34.5208	4.1687	34.5421	4.1755	34.5634	4.1822	34.5847	4.1889	34.6061
5510	4.2294	34.7339	4.2361	34.7552	4.2428	34.7765	4.2496	34.7978	4.2563	34.8191
5520	4.2967	34.9468	4.3034	34.9681	4.3102	34.9894	4.3169	35.0106	4.3236	35.0319
5530	4.3640	35.1595	4.3707	35.1808	4.3774	35.2020	4.3841	35.2233	4.3909	35.2446
5540	4.4312	35.3720	4.4379	35.3933	4.4446	35.4145	4.4513	35.4358	4.4580	35.4570
5550	4.4983	35.5844	4.5050	35.6056	4.5117	35.6268	4.5185	35.6480	4.5252	35.6693
5560	4.5654	35.7965	4.5721	35.8177	4.5788	35.8389	4.5855	35.8601	4.5922	35.8813
5570	4.6324	36.0085	4.6391	36.0297	4.6458	36.0508	4.6525	36.0720	4.6592	36.0932
5580	4.6994	36.2202	4.7061	36.2414	4.7128	36.2626	4.7195	36.2837	4.7262	36.3049
5590	4.7663	36.4318	4.7730	36.4530	4.7797	36.4741	4.7864	36.4952	4.7930	36.5164
5600	4.8331	36.6432	4.8398	36.6643	4.8465	36.6854	4.8532	36.7066	4.8599	36.7277
5610	4.8999	36.8544	4.9066	36.8755	4.9133	36.8966	4.9200	36.9177	4.9266	36.9388
5620	4.9667	37.0654	4.9733	37.0865	4.9800	37.1076	4.9867	37.1287	4.9933	37.1497
5630	5.0333	37.2762	5.0400	37.2973	5.0467	37.3184	5.0533	37.3394	5.0600	37.3605
5640	5.0999	37.4868	5.1066	37.5079	5.1132	37.5289	5.1199	37.5500	5.1266	37.5710
5650	5.1665	37.6973	5.1731	37.7183	5.1798	37.7394	5.1864	37.7604	5.1931	37.7814
5660	5.2330	37.9075	5.2396	37.9286	5.2463	37.9496	5.2529	37.9706	5.2596	37.9916
5670	5.2994	38.1176	5.3060	38.1386	5.3127	38.1596	5.3193	38.1806	5.3260	38.2016
5680	5.3658	38.3275	5.3724	38.3485	5.3790	38.3695	5.3857	38.3904	5.3923	38.4114
5690	5.4321	38.5372	5.4387	38.5582	5.4453	38.5791	5.4520	38.6001	5.4586	38.6210
5700	5.4983	38.7467	5.5050	38.7677	5.5116	38.7886	5.5182	38.8095	5.5248	38.8305
5710	5.5645	38.9561	5.5712	38.9770	5.5778	38.9979	5.5844	39.0188	5.5910	39.0397
5720	5.6307	39.1652	5.6373	39.1861	5.6439	39.2070	5.6505	39.2279	5.6571	39.2488
5730	5.6968	39.3742	5.7034	39.3951	5.7100	39.4160	5.7166	39.4368	5.7232	39.4577
5740	5.7628	39.5830	5.7694	39.6038	5.7760	39.6247	5.7826	39.6456	5.7892	39.6664
5750	5.8288	39.7916	5.8353	39.8124	5.8419	39.8333	5.8485	39.8541	5.8551	39.8750
5760	5.8947	40.0000	5.9013	40.0208	5.9078	40.0417	5.9144	40.0625	5.9210	40.0833
5770	5.9605	40.2082	5.9671	40.2291	5.9737	40.2499	5.9803	40.2707	5.9868	40.2915
5780	6.0263	40.4163	6.0329	40.4371	6.0395	40.4579	6.0460	40.4787	6.0526	40.4995
5790	6.0921	40.6242	6.0986	40.6450	6.1052	40.6657	6.1118	40.6865	6.1183	40.7073
5800	6.1577	40.8319	6.1643	40.8527	6.1709	40.8734	6.1774	40.8942	6.1840	40.9149
5810	6.2234	41.0394	6.2299	41.0602	6.2365	41.0809	6.2430	41.1016	6.2496	41.1224
5820	6.2889	41.2468	6.2955	41.2675	6.3020	41.2882	6.3086	41.3089	6.3151	41.3297
5830	6.3544	41.4539	6.3610	41.4746	6.3675	41.4953	6.3741	41.5160	6.3806	41.5367
5840	6.4199	41.6609	6.4264	41.6816	6.4330	41.7023	6.4395	41.7230	6.4461	41.7437
5850	6.4853	41.8677	6.4918	41.8884	6.4984	41.9091	6.5049	41.9297	6.5114	41.9504
5860	6.5506	42.0744	6.5572	42.0950	6.5637	42.1157	6.5702	42.1363	6.5768	42.1570
5870	6.6159	42.2808	6.6225	42.3015	6.6290	42.3221	6.6355	42.3427	6.6420	42.3634
5880	6.6812	42.4871	6.6877	42.5077	6.6942	42.5283	6.7007	42.5490	6.7072	42.5696
5890	6.7463	42.6932	6.7529	42.7138	6.7594	42.7344	6.7659	42.7550	6.7724	42.7756
5900	6.8115	42.8992	6.8180	42.9197	6.8245	42.9403	6.8310	42.9609	6.8375	42.9815
5910	6.8765	43.1049	6.8830	43.1255	6.8895	43.1460	6.8960	43.1666	6.9025	43.1872
5920	6.9415	43.3105	6.9480	43.3311	6.9545	43.3516	6.9610	43.3721	6.9675	43.3927
5930	7.0065	43.5159	7.0130	43.5364	7.0195	43.5570	7.0260	43.5775	7.0325	43.5980
5940	7.0714	43.7212	7.0779	43.7417	7.0844	43.7622	7.0909	43.7827	7.0973	43.8032
	70+	200+	70+	200+	70+	200+	70+	200+	70+	200+

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
70+	200+	70+	200+	70+	200+	70+	200+	70+	200+	
4.1957	34.6274	4.2024	34.6487	4.2092	34.6700	4.2159	34.6913	4.2226	34.7126	5500
4.2630	34.8404	4.2698	34.8617	4.2765	34.8830	4.2832	34.9042	4.2900	34.9255	5510
4.3303	35.0532	4.3371	35.0745	4.3438	35.0957	4.3505	35.1170	4.3572	35.1383	5520
4.3976	35.2658	4.4043	35.2871	4.4110	35.3083	4.4177	35.3296	4.4245	35.3508	5530
4.4648	35.4782	4.4715	35.4995	4.4782	35.5207	4.4849	35.5419	4.4916	35.5632	5540
4.5319	35.6905	4.5386	35.7117	4.5453	35.7329	4.5520	35.7541	4.5587	35.7753	5550
4.5989	35.9025	4.6056	35.9237	4.6123	35.9449	4.6190	35.9661	4.6257	35.9873	5560
4.6659	36.1144	4.6726	36.1356	4.6793	36.1567	4.6860	36.1779	4.6927	36.1991	5570
4.7329	36.3260	4.7395	36.3472	4.7462	36.3684	4.7529	36.3895	4.7596	36.4107	5580
4.7997	36.5375	4.8064	36.5587	4.8131	36.5798	4.8198	36.6009	4.8265	36.6221	5590
4.8665	36.7488	4.8732	36.7699	4.8799	36.7910	4.8866	36.8122	4.8933	36.8333	5600
4.9333	36.9599	4.9400	36.9810	4.9466	37.0021	4.9533	37.0232	4.9600	37.0443	5610
5.0000	37.1708	5.0067	37.1919	5.0133	37.2130	5.0200	37.2341	5.0267	37.2551	5620
5.0666	37.3815	5.0733	37.4026	5.0800	37.4237	5.0866	37.4447	5.0933	37.4658	5630
5.1332	37.5921	5.1399	37.6131	5.1465	37.6342	5.1532	37.6552	5.1598	37.6763	5640
5.1997	37.8024	5.2064	37.8235	5.2130	37.8445	5.2197	37.8655	5.2263	37.8865	5650
5.2662	38.0126	5.2728	38.0336	5.2795	38.0546	5.2861	38.0756	5.2928	38.0966	5660
5.3326	38.2226	5.3392	38.2436	5.3459	38.2646	5.3525	38.2855	5.3591	38.3065	5670
5.3989	38.4324	5.4056	38.4534	5.4122	38.4743	5.4188	38.4953	5.4255	38.5162	5680
5.4652	38.6420	5.4718	38.6629	5.4785	38.6839	5.4851	38.7048	5.4917	38.7258	5690
5.5315	38.8514	5.5381	38.8724	5.5447	38.8933	5.5513	38.9142	5.5579	38.9351	5700
5.5976	39.0607	5.6042	39.0816	5.6108	39.1025	5.6175	39.1234	5.6241	39.1443	5710
5.6637	39.2697	5.6703	39.2906	5.6769	39.3115	5.6836	39.3324	5.6902	39.3533	5720
5.7298	39.4786	5.7364	39.4995	5.7430	39.5204	5.7496	39.5412	5.7562	39.5621	5730
5.7958	39.6873	5.8024	39.7082	5.8090	39.7290	5.8156	39.7499	5.8222	39.7707	5740
5.8617	39.8958	5.8683	39.9167	5.8749	39.9375	5.8815	39.9583	5.8881	39.9792	5750
5.9276	40.1041	5.9342	40.1250	5.9408	40.1458	5.9474	40.1666	5.9539	40.1874	5760
5.9934	40.3123	6.0000	40.3331	6.0066	40.3539	6.0132	40.3747	6.0197	40.3955	5770
6.0592	40.5203	6.0658	40.5411	6.0723	40.5618	6.0789	40.5826	6.0855	40.6034	5780
6.1249	40.7281	6.1315	40.7488	6.1380	40.7696	6.1446	40.7904	6.1512	40.8111	5790
6.1906	40.9357	6.1971	40.9564	6.2037	40.9772	6.2102	40.9979	6.2168	41.0187	5800
6.2561	41.1431	6.2627	41.1638	6.2693	41.1846	6.2758	41.2053	6.2824	41.2260	5810
6.3217	41.3504	6.3282	41.3711	6.3348	41.3918	6.3413	41.4125	6.3479	41.4332	5820
6.3872	41.5574	6.3937	41.5781	6.4003	41.5988	6.4068	41.6195	6.4134	41.6402	5830
6.4526	41.7643	6.4591	41.7850	6.4657	41.8057	6.4722	41.8264	6.4788	41.8471	5840
6.5180	41.9711	6.5245	41.9917	6.5310	42.0124	6.5376	42.0331	6.5441	42.0537	5850
6.5833	42.1776	6.5898	42.1983	6.5963	42.2189	6.6029	42.2396	6.6094	42.2602	5860
6.6485	42.3840	6.6551	42.4046	6.6616	42.4252	6.6681	42.4459	6.6746	42.4665	5870
6.7138	42.5902	6.7203	42.6108	6.7268	42.6314	6.7333	42.6520	6.7398	42.6726	5880
6.7789	42.7962	6.7854	42.8168	6.7919	42.8374	6.7984	42.8580	6.8049	42.8786	5890
6.8440	43.0021	6.8505	43.0226	6.8570	42.0432	6.8635	43.0638	6.8700	43.0843	5900
6.9090	43.2077	6.9155	43.2283	6.9220	43.2488	6.9285	43.2694	6.9350	43.2900	5910
6.9740	43.4132	6.9805	43.4338	6.9870	43.4543	6.9935	43.4748	7.0000	43.4954	5920
7.0390	43.6186	7.0454	43.6391	7.0519	43.6596	7.0584	43.6801	7.0649	43.7006	5930
7.1038	43.8237	7.1103	43.8442	7.1168	43.8647	7.1233	43.8852	7.1298	43.9057	5940
70+	200+	70+	200+	70+	200+	70+	200+	70+	200+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	70+	. 200+	70+	200+	70+	200+	70+	200+	70+	200+
5950	7.1362	43.9262	7.1427	43.9467	7.1492	43.9672	7.1557	43.9877	7.1622	44.0082
5960	7.2010	44.1311	7.2075	44.1516	7.2140	44.1721	7.2205	44.1925	7.2269	44.2130
5970	7.2658	44.3358	7.2722	44.3563	7.2787	44.3768	7.2852	44.3972	7.2917	44.4177
5980	7.3305	44.5404	7.3369	44.5608	7.3434	44.5813	7.3499	44.6017	7.3563	44.6222
5990	7.3951	44.7448	7.4016	44.7652	7.4080	44.7856	7.4145	44.8060	7.4209	44.8265
6000	7.4597	44.9490	7.4661	44.9694	7.4726	44.9898	7.4790	45.0102	7.4855	45.0306
6010	7.5242	45.1530	7.5306	45.1734	7.5371	45.1938	7.5435	45.2142	7.5500	45.2346
6020	7.5887	45.3569	7.5951	45.3773	7.6015	45.3976	7.6080	45.4180	7.6144	45.4384
6030	7.6531	45.5606	7.6595	45.5809	7.6660	45.6013	7.6724	45.6217	7.6788	45.6420
6040	7.7174	45.7641	7.7239	45.7845	7.7303	45.8048	7.7367	45.8251	7.7432	45.8455
6050	7.7817	45.9675	7.7881	45.9878	7.7946	46.0081	7.8010	46.0285	7.8075	46.0488
6060	7.8460	46.1707	7.8524	46.1910	7.8588	46.2113	7.8653	46.2316	7.8717	46.2519
6070	7.9102	46.3737	7.9166	46.3940	7.9230	46.4143	7.9295	46.4346	7.9359	46.4549
6080	7.9744	46.5766	7.9808	46.5968	7.9872	46.6171	7.9936	46.6374	8.0000	46.6577
6090	8.0385	46.7793	8.0449	46.7995	8.0513	46.8198	8.0577	46.8400	8.0641	46.8603
6100	8.1025	46.9818	8.1089	47.0020	8.1153	47.0223	8.1217	47.0425	8.1281	47.0627
6110	8.1665	47.1841	8.1729	47.2044	8.1793	47.2246	8.1857	47.2448	8.1921	47.2650
6120	8.2304	47.3863	8.2368	47.4065	8.2432	47.4268	8.2496	47.4470	8.2560	47.4672
6130	8.2943	47.5884	8.3007	47.6086	8.3071	47.6288	8.3135	47.6489	8.3199	47.6691
6140	8.3582	47.7902	8.3645	47.8104	8.3709	47.8306	8.3773	47.8508	8.3837	47.8709
6150	8.4219	47.9919	8.4283	48.0121	8.4347	48.0323	8.4411	48.0524	8.4474	48.0726
6160	8.4857	48.1935	8.4920	48.2136	8.4984	48.2338	8.5048	48.2539	8.5111	48.2740
6170	8.5493	48.3948	8.5557	48.4150	8.5621	48.4351	8.5684	48.4552	8.5748	48.4754
6180	8.6130	48.5961	8.6193	48.6162	8.6257	48.6363	8.6321	48.6564	8.6384	48.6765
6190	8.6766	48.7971	8.6829	48.8172	8.6893	48.8373	8.6956	48.8574	8.7020	46.8775
6200	8.7401	48.9980	8.7464	49.0181	8.7528	49.0382	8.7591	49.0582	8.7655	49.0783
6210	8.8036	49.1987	8.8099	49.2188	8.8162	49.2388	8.8226	49.2589	8.8289	49.2790
6220	8.8670	49.3993	8.8733	49.4193	8.8797	49.4394	8.8860	49.4594	8.8923	49.4795
6230	8.9303	49.5997	8.9367	49.6197	8.9430	49.6397	8.9494	49.6598	8.9557	49.6798
6240	8.9937	49.7999	9.0000	49.8199	9.0063	49.8399	9.0127	49.8600	9.0190	49.8800
6250	9.0569	50.0000	9.0633	50.0200	9.0696	50.0400	9.0759	50.0600	9.0822	50.0800
6260	9.1202	50.1999	9.1265	50.2199	9.1328	50.2399	9.1391	50.2599	9.1454	50.2798
6270	9.1833	50.3997	9.1896	50.4196	9.1960	50.4396	9.2023	50.4596	9.2086	50.4795
6280	9.2465	50.5993	9.2528	50.6192	9.2591	50.6392	9.2654	50.6591	9.2717	50.6791
6290	9.3095	50.7987	9.3158	50.8187	9.3221	50.8386	9.3284	50.8585	9.3347	50.8785
6300	9.3725	50.9980	9.3788	51.0179	9.3851	51.0378	9.3914	51.0578	9.3977	51.0777
6310	9.4355	51.1971	9.4418	51.2170	9.4481	51.2369	9.4544	51.2568	9.4607	51.2767
6320	9.4984	51.3961	9.5047	51.4160	9.5110	51.4359	9.5173	51.4558	9.5236	51.4756
6330	9.5613	51.5949	9.5676	51.6148	9.5739	51.6347	9.5801	51.6545	9.5864	51.6744
6340	9.6241	51.7936	9.6304	51.8134	9.6367	51.8333	9.6430	51.8531	9.6492	51.8730
6350	9.6869	51.9920	9.6932	52.0119	9.6994	52.0317	9.7057	52.0516	9.7120	52.0714
6360	9.7496	52.1904	9.7559	52.2102	9.7621	52.2301	9.7684	52.2499	9.7747	52.2697
6370	9.8123	52.3886	9.8185	52.4084	9.8248	52.4282	9.8311	52.4480	9.8373	52.4678
6380	9.8749	52.5866	9.8812	52.6064	9.8874	52.6262	9.8937	52.6460	9.8999	52.6658
6390	9.9375	52.7845	9.9437	52.8043	9.9500	52.8240	9.9562	52.8438	9.9625	52.8636
	70+	200+	70+	200+	70+	200+	70+	200+	70+	200+

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
70+	200+	70+	200+	70+	200+	70+	200+	70+	200+	
7.1686	44.0287	7.1751	44.0492	7.1816	44.0697	7.1881	44.0901	7.1946	44.1106	5950
7.2334	44.2335	7.2399	44.2540	7.2464	44.2744	7.2528	44.2949	7.2593	44.3154	5960
7.2981	44.4381	7.3046	44.4586	7.3111	44.4790	7.3175	44.4995	7.3240	44.5199	5970
7.3628	44.6426	7.3692	44.6630	7.3757	44.6835	7.3822	44.7039	7.3886	44.7243	5980
7.4274	44.8469	7.4338	44.8673	7.4403	44.8977	7.4468	44.9081	7.4532	44.9286	5990
7.4919	45.0510	7.4984	45.0714	7.5048	45.0918	7.5113	45.1122	7.5177	45.1326	6000
7.5564	45.2550	7.5629	45.2754	7.5693	45.2957	7.5758	45.3161	7.5822	45.3365	6010
7.6209	45.4588	7.6273	45.4791	7.6338	45.4995	7.6402	45.5199	7.6466	45.5402	6020
7.6853	45.6624	7.6917	45.6827	7.6981	45.7031	7.7046	45.7234	7.7110	45.7438	6030
7.7496	45.8658	7.7560	45.8862	7.7625	45.9065	7.7689	45.9268	7.7753	45.9471	6040
7.8139	46.0691	7.8203	46.0894	7.8267	46.1097	7.8332	46.1300	7.8396	46.1504	6050
7.8781	46.2722	7.8845	46.2925	7.8909	46.3128	7.8974	46.3331	7.9038	46.3534	6060
7.9423	46.4752	7.9487	46.4954	7.9551	46.5157	7.9615	46.5360	7.9679	46.5563	6070
8.0064	46.6779	8.0128	46.6982	8.0192	46.7185	8.0256	46.7387	8.0320	46.7590	6080
8.0705	46.8805	8.0769	46.9008	8.0833	46.9210	8.0897	46.9413	8.0961	46.9615	6090
8.1345	47.0830	8.1409	47.1032	8.1473	47.1235	8.1537	47.1437	8.1601	47.1639	6100
8.1985	47.2853	8.2049	47.3055	8.2113	47.3257	8.2176	47.3459	8.2240	47.3661	6110
8.2624	47.4874	8.2688	47.5076	8.2752	47.5278	8.2815	47.5480	8.2879	47.5682	6120
8.3282	47.6893	8.3326	47.7095	8.3390	47.7297	8.3454	47.7499	8.3518	47.7701	6130
8.3901	47.8911	8.3964	47.9113	8.4028	47.9314	8.4092	47.9516	8.4156	47.9718	6140
8.4538	48.0927	8.4602	48.1129	8.4666	48.1330	8.4729	48.1532	8.4793	48.1733	6150
8.5175	48.2942	8.5239	48.3143	8.5302	48.3345	8.5366	48.3546	8.5430	48.3747	6160
8.5812	48.4955	8.5875	48.5156	8.5939	48.5357	8.6003	48.5558	8.6066	48.5759	6170
8.6448	48.6966	8.6511	48.7167	8.6575	48.7368	8.6638	48.7569	8.6702	48.7770	6180
8.7083	48.8976	8.7147	48.9177	8.7210	48.9377	8.7274	48.9578	8.7337	48.9779	6190
8.7718	49.0984	8.7782	49.1184	8.7845	49.1385	8.7909	49.1586	8.7972	49.1787	6200
8.8353	49.2990	8.8416	49.3191	8.8480	49.3391	8.8543	49.3592	8.8606	49.3792	6210
8.8987	49.4995	8.9050	49.5195	8.9113	49.5396	8.9177	49.5596	8.9240	49.5796	6220
8.9620	49.6998	8.9683	49.7198	8.9747	49.7399	8.9810	49.7599	8.9873	49.7799	6230
9.0253	49.9000	9.0316	49.9200	9.0380	49.9400	9.0443	49.9600	9.0506	49.9800	6240
9.0886	50.1000	9.0949	50.1200	9.1012	50.1400	9.1075	50.1599	9.1138	50.1799	6250
9.1518	50.2998	9.1581	50.3198	9.1644	50.3398	9.1707	50.3597	9.1770	50.3797	6260
9.2149	50.4995	9.2212	50.5195	9.2275	50.5394	9.2338	50.5594	9.2401	50.5793	6270
9.2780	50.6990	9.2843	50.7190	9.2906	50.7389	9.2969	50.7588	9.3032	50.7788	6280
9.3410	50.8984	9.3473	50.9183	9.3536	50.9382	9.3599	50.9582	9.3662	50.9781	6290
9.4040	51.0976	9.4103	51.1175	9.4166	51.1374	9.4229	51.1573	9.4292	51.1772	6300
9.4670	51.2966	9.4733	51.3165	9.4796	51.3364	9.4858	51.3563	9.4921	51.3762	6310
9.5299	51.4955	9.5362	51.5154	9.5424	51.5353	9.5487	51.5552	9.5550	51.5750	6320
9.5927	51.6943	9.5990	51.7141	9.6053	51.7340	9.6116	51.7538	9.6178	51.7737	6330
9.6555	51.8928	9.6618	51.9127	9.6681	51.9325	9.6743	51.9524	9.6806	51.9722	6340
9.7183	52.0913	9.7245	52.1111	9.7308	52.1309	9.7371	52.1507	9.7433	52.1706	6350
9.7810	52.2895	9.7872	52.3093	9.7935	52.3292	9.7997	52.3490	9.8060	52.3688	6360
9.8436	52.4876	9.8499	52.5074	9.8561	52.5272	9.8624	52.5470	9.8686	52.5668	6370
9.9062	52.6856	9.9125	52.7054	9.9187	52.7251	9.9250	52.7449	9.9312	52.7647	6380
9.9687	52.8834	9.9750	52.9031	9.9812	52.9229	9.9875	52.9427	9.9938	52.9624	6390
70+	200+	70+	200+	70+	200+	70+	200+	70+	200+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	80+	200+	80+	200+	80+	200+	80+	200+	80+	200+
6400	0.0000	52.9822	0.0063	53.0020	0.0125	53.0217	0.0187	53.0415	0.0250	53.0613
6410	0.0625	53.1798	0.0687	53.1995	0.0750	53.2193	0.0812	53.2390	0.0875	53.2588
6420	0.1249	53.3772	0.1311	53.3969	0.1374	53.4167	0.1436	53.4364	0.1499	53.4561
6430	0.1873	53.5744	0.1935	53.5942	0.1998	53.6139	0.2060	53.6336	0.2122	53.6533
6440	0.2496	53.7716	0.2558	53.7913	0.2621	53.8110	0.2683	53.8307	0.2745	53.8504
6450	0.3119	53.9685	0.3181	53.9882	0.3243	54.0079	0.3306	54.0276	0.3368	54.0472
6460	0.3741	54.1653	0.3803	54.1850	0.3866	54.2046	0.3928	54.2243	0.3990	54.2440
6470	0.4363	54.3619	0.4425	54.3816	0.4487	54.4013	0.4550	54.4209	0.4612	54.4406
6480	0.4984	54.5584	0.5047	54.5781	0.5109	54.5977	0.5171	54.6174	0.5233	54.6370
6490	0.5605	54.7548	0.5667	54.7744	0.5729	54.7940	0.5792	54.8137	0.5854	54.8333
6500	0.6226	54.9510	0.6288	54.9706	0.6350	54.9902	0.6412	55.0098	0.6474	55.0294
6510	0.6846	55.1470	0.6908	55.1666	0.6970	55.1862	0.7032	55.2058	0.7094	55.2254
6520	0.7465	55.3429	0.7527	55.3625	0.7589	55.3821	0.7651	55.4016	0.7713	55.4212
6530	0.8084	55.5386	0.8146	55.5582	0.8208	55.5778	0.8270	55.5973	0.8332	55.6169
6540	0.8703	55.7342	0.8764	55.7538	0.8826	55.7733	0.8888	55.7929	0.8950	55.8124
6550	0.9321	55.9297	0.9382	55.9492	0.9444	55.9687	0.9506	55.9883	0.9568	56.0078
6560	0.9938	56.1250	1.0000	56.1445	1.0062	56.1640	1.0123	56.1835	1.0185	56.2030
6570	1.0555	56.3201	1.0617	56.3396	1.0679	56.3591	1.0740	56.3786	1.0802	56.3981
6580	1.1172	56.5151	1.1234	56.5346	1.1295	56.5541	1.1357	56.5736	1.1419	56.5931
6590	1.1788	56.7100	1.1850	56.7294	1.1911	56.7489	1.1973	56.7684	1.2034	56.7879
6600	1.2404	56.9047	1.2465	56.9241	1.2527	56.9436	1.2588	56.9630	1.2650	56.9825
6610	1.3019	57.0992	1.3081	57.1187	1.3142	57.1381	1.3204	57.1575	1.3265	57.1770
6620	1.3634	57.2936	1.3695	57.3130	1.3757	57.3325	1.3818	57.3519	1.3880	57.3713
6630	1.4248	57.4879	1.4310	57.5073	1.4371	57.5267	1.4432	57.5461	1.4494	57.5655
6640	1.4862	57.6820	1.4923	57.7014	1.4985	57.7208	1.5046	57.7402	1.5107	57.7596
6650	1.5475	57.8759	1.5537	57.8953	1.5598	57.9147	1.5659	57.9341	1.5721	57.9535
6660	1.6088	58.0698	1.6150	58.0891	1.6211	58.1085	1.6272	58.1279	1.6333	58.1472
6670	1.6701	58.2634	1.6762	58.2828	1.6823	58.3021	1.6884	58.3215	1.6946	58.3409
6680	1.7313	58.4570	1.7374	58.4763	1.7435	58.4956	1.7496	58.5150	1.7557	58.5343
6690	1.7924	58.6503	1.7985	58.6697	1.8046	58.6890	1.8108	58.7083	1.8169	58.7277
6700	1.8535	58.8436	1.8596	58.8629	1.8657	58.8822	1.8719	58.9015	1.8780	58.9208
6710	1.9146	59.0367	1.9207	59.0560	1.9268	59.0753	1.9329	59.0946	1.9390	59.1139
6720	1.9756	59.2296	1.9817	59.2489	1.9878	59.2682	1.9939	59.2875	2.0000	59.3068
6730	2.0366	59.4224	2.0427	59.4417	2.0488	59.4610	2.0549	59.4803	2.0610	59.4995
6740	2.0975	59.6151	2.1036	59.6344	2.1097	59.6536	2.1158	59.6729	2.1219	59.6921
6750	2.1584	59.8076	2.1645	59.8269	2.1706	59.8461	2.1766	59.8654	2.1827	59.8846
6760	2.2192	60.0000	2.2253	60.0192	2.2314	60.0385	2.2375	60.0577	2.2435	60.0769
6770	2.2800	60.1922	2.2861	60.2115	2.2922	60.2307	2.2982	60.2499	2.3043	60.2691
6780	2.3408	60.3843	2.3468	60.4035	2.3529	60.4227	2.3590	60.4419	2.3650	60.4611
6790	2.4015	60.5763	2.4075	60.5955	2.4136	60.6147	2.4197	60.6338	2.4257	60.6530
6800	2.4621	60.7681	2.4682	60.7873	2.4742	60.8064	2.4803	60.8256	2.4864	60.8448
6810	2.5227	60.9598	2.5288	60.9789	2.5348	60.9981	2.5409	61.0172	2.5470	61.0364
6820	2.5833	61.1513	2.5893	61.1704	2.5954	61.1896	2.6015	61.2087	2.6075	61.2279
6830	2.6438	61.3427	2.6499	61.3618	2.6559	61.3809	2.6620	61.4001	2.6680	61.4192
6840	2.7043	61.5339	2.7103	61.5531	2.7164	61.5722	2.7224	61.5913	2.7285	61.6104
	80+	200+	80+	200+	80+	200+	80+	200+	80+	200+

SQUARE ROOTS

5		6		7		8		9		
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	N
80+	200+	80+	200+	80+	200+	80+	200+	80+	200+	
0.0312	53.0810	*0.0375	53.1008	*0.0437	53.1205	*0.0500	53.1403	*0.0562	53.1600	6400
0.0937	53.2785	0.0999	53.2982	0.1062	53.3180	0.1124	53.3377	0.1187	53.3575	6410
0.1561	53.4758	0.1623	53.4956	0.1686	53.5153	0.1748	53.5350	0.1810	53.5547	6420
0.2185	53.6730	0.2247	53.6927	0.2309	53.7124	0.2371	53.7321	0.2434	53.7518	6430
0.2808	53.8700	0.2870	53.8897	0.2932	53.9094	0.2994	53.9291	0.3057	53.9488	6440
0.3430	54.0669	0.3492	54.0866	0.3555	54.1063	0.3617	54.1260	0.3679	54.1456	6450
0.4052	54.2636	0.4114	54.2833	0.4177	54.3030	0.4239	54.3226	0.4301	54.3423	6460
0.4674	54.4602	0.4736	54.4799	0.4798	54.4995	0.4860	54.5192	0.4922	54.5388	6470
0.5295	54.6566	0.5357	54.6763	0.5419	54.6959	0.5481	54.7155	0.5543	54.7352	6480
0.5916	54.8529	0.5978	54.8725	0.6040	54.8921	0.6102	54.9117	0.6164	54.9314	6490
0.6536	55.0490	0.6598	55.0686	0.6660	55.0882	0.6722	55.1078	0.6784	55.1274	6500
0.7156	55.2450	0.7217	55.2646	0.7279	55.2842	0.7341	55.3037	0.7403	55.3233	6510
0.7775	55.4408	0.7837	55.4604	0.7899	55.4799	0.7960	55.4995	0.8022	55.5191	6520
0.8393	55.6365	0.8455	55.6560	0.8517	55.6756	0.8579	55.6951	0.8641	55.7147	6530
0.9102	55.8320	0.9074	55.8515	0.9135	55.8711	0.9197	55.8906	0.9259	55.9101	6540
0.9630	56.0273	0.9691	56.0469	0.9753	56.0664	0.9815	56.0859	0.9877	56.1054	6550
1.0247	56.2226	1.0309	56.2421	1.0370	56.2616	1.0432	56.2811	1.0494	56.3006	6560
1.0864	56.4176	1.0925	56.4371	1.0987	56.4566	1.1049	56.4761	1.1110	56.4956	6570
1.1480	56.6125	1.1542	56.6320	1.1603	56.6515	1.1665	56.6710	1.1727	56.6905	6580
1.2096	56.8073	1.2158	56.8268	1.2219	56.8463	1.2281	56.8657	1.2342	56.8852	6590
1.2712	57.0019	1.2773	57.0214	1.2835	57.0409	1.2896	57.0603	1.2958	57.0798	6600
1.3327	57.1964	1.3388	57.2159	1.3449	57.2353	1.3511	57.2547	1.3572	57.2742	6610
1.3941	57.3908	1.4002	57.4102	1.4064	57.4296	1.4125	57.4490	1.4187	57.4684	6620
1.4555	57.5849	1.4616	57.6043	1.4678	57.6238	1.4739	57.6432	1.4801	57.6626	6630
1.5169	57.7790	1.5230	57.7984	1.5291	57.8178	1.5353	57.8372	1.5414	57.8565	6640
1.5782	57.9729	1.5843	57.9922	1.5904	58.0116	1.5966	58.0310	1.6027	58.0504	6650
1.6395	58.1666	1.6456	58.1860	1.6517	58.2053	1.6578	58.2247	1.6639	58.2441	6660
1.7007	58.3602	1.7068	58.3796	1.7129	58.3989	1.7190	58.4183	1.7251	58.4376	6670
1.7618	58.5537	1.7680	58.5730	1.7741	58.5923	1.7802	58.6117	1.7863	58.6310	6680
1.8230	58.7470	1.8291	58.7663	1.8352	58.7856	1.8413	58.8049	1.8474	58.8243	6690
1.8841	58.9401	1.8902	58.9595	1.8963	58.9788	1.9024	58.9981	1.9085	59.0174	6700
1.9451	59.1332	1.9512	59.1525	1.9573	59.1718	1.9634	59.1910	1.9695	59.2103	6710
2.0061	59.3261	2.0122	59.3453	2.0183	59.3646	2.0244	59.3839	2.0305	59.4032	6720
2.0670	59.5188	2.0731	59.5381	2.0792	59.5573	2.0853	59.5766	2.0914	59.5958	6730
2.1279	59.7114	2.1340	59.7306	2.1401	59.7499	2.1462	59.7691	2.1523	59.7884	6740
2.1888	59.9038	2.1949	59.9231	2.2010	59.9423	2.2071	59.9615	2.2131	59.9808	6750
2.2496	60.0961	2.2557	60.1154	2.2618	60.1346	2.2679	60.1538	2.2739	60.1730	6760
2.3104	60.2883	2.3165	60.3075	2.3225	60.3267	2.3286	60.3459	2.3347	60.3651	6770
2.3711	60.4803	2.3772	60.4995	2.3833	60.5187	2.3893	60.5379	2.3954	60.5571	6780
2.4318	60.6722	2.4379	60.6914	2.4439	60.7106	2.4500	60.7297	2.4560	60.7489	6790
2.4924	60.8639	2.4985	60.8831	2.5045	60.9023	2.5106	60.9214	2.5167	60.9406	6800
2.5530	61.0556	2.5591	61.0747	2.5651	61.0939	2.5712	61.1130	2.5772	61.1322	6810
2.6136	61.2470	2.6196	61.2661	2.6257	61.2853	2.6317	61.3044	2.6378	61.3236	6820
2.6741	61.4383	2.6801	61.4575	2.6862	61.4766	2.6922	61.4957	2.6982	61.5148	6830
2.7345	61.6295	2.7406	61.6486	2.7466	61.6677	2.7526	61.6868	2.7587	61.7059	6840
80+	200+	80+	200+	80+	200+	80+	200+	80+	200+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	80+	200+	80+	200+	80+	200+	80+	200+	80+	200+
6850	2.7647	61.7250	2.7708	61.7442	2.7768	61.7633	2.7828	61.7824	2.7889	61.8015
6860	2.8251	61.9160	2.8312	61.9351	2.8372	61.9542	2.8432	61.9733	2.8493	61.9924
6870	2.8855	62.1068	2.8915	62.1259	2.8975	62.1450	2.9036	62.1641	2.9096	62.1831
6880	2.9458	62.2975	2.9518	62.3166	2.9578	62.3357	2.9638	62.3547	2.9699	62.3738
6890	3.0060	62.4881	3.0120	62.5071	3.0181	62.5262	3.0241	62.5452	3.0301	62.5643
6900	3.0662	62.6785	3.0723	62.6975	3.0783	62.7166	3.0843	62.7356	3.0903	62.7546
6910	3.1264	62.8688	3.1324	62.8878	3.1384	62.9068	3.1445	62.9258	3.1505	62.9449
6920	3.1865	63.0589	3.1925	63.0779	3.1986	63.0969	3.2046	63.1159	3.2106	63.1349
6930	3.2466	63.2489	3.2526	63.2679	3.2586	63.2869	3.2646	63.3059	3.2706	63.3249
6940	3.3067	63.4388	3.3127	63.4578	3.3187	63.4768	3.3247	63.4957	3.3307	63.5147
6950	3.3667	63.6285	3.3727	63.6475	3.3787	63.6665	3.3847	63.6854	3.3906	63.7044
6960	3.4266	63.8181	3.4326	63.8371	3.4386	63.8560	3.4446	63.8750	3.4506	63.8939
6970	3.4865	64.0076	3.4925	64.0265	3.4985	64.0455	3.5045	64.0644	3.5105	64.0833
6980	3.5464	64.1969	3.5524	64.2158	3.5584	64.2347	3.5643	64.2537	3.5703	64.2726
6990	3.6062	64.3861	3.6122	64.4050	3.6182	64.4239	3.6242	64.4428	3.6301	64.4617
7000	3.6660	64.5751	3.6720	64.5940	3.6780	64.6129	3.6839	64.6318	3.6899	64.6507
7010	3.7257	64.7640	3.7317	64.7829	3.7377	64.8018	3.7437	64.8207	3.7496	64.8396
7020	3.7854	64.9528	3.7914	64.9717	3.7974	64.9906	3.8033	65.0094	3.8093	65.0283
7030	3.8451	65.1415	3.8511	65.1603	3.8570	65.1792	3.8630	65.1980	3.8689	65.2169
7040	3.9047	65.3300	3.9107	65.3488	3.9166	65.3677	3.9226	65.3865	3.9285	65.4054
7050	3.9643	65.5184	3.9702	65.5372	3.9762	65.5560	3.9821	65.5748	3.9881	65.5937
7060	4.0238	65.7066	4.0298	65.7254	4.0357	65.7442	4.0417	65.7631	4.0476	65.7819
7070	4.0833	65.8947	4.0892	65.9135	4.0952	65.9323	4.1011	65.9511	4.1071	65.9699
7080	4.1427	66.0827	4.1487	66.1015	4.1546	66.1203	4.1606	66.1391	4.1665	66.1578
7090	4.2021	66.2705	4.2081	66.2893	4.2140	66.3081	4.2200	66.3269	4.2259	66.3456
7100	4.2615	66.4583	4.2674	66.4770	4.2734	66.4958	4.2793	66.5145	4.2852	66.5333
7110	4.3208	66.6458	4.3267	66.6646	4.3327	66.6833	4.3386	66.7021	4.3445	66.7208
7120	4.3801	66.8333	4.3860	66.8520	4.3919	66.8708	4.3979	66.8895	4.4038	66.9082
7130	4.4393	67.0206	4.4452	67.0393	4.4512	67.0580	4.4571	67.0768	4.4630	67.0955
7140	4.4985	67.2078	4.5044	67.2265	4.5104	67.2452	4.5163	67.2639	4.5222	67.2826
7150	4.5577	67.3948	4.5636	67.4135	4.5695	67.4322	4.5754	67.4509	4.5813	67.4696
7160	4.6168	67.5818	4.6227	67.6004	4.6286	67.6191	4.6345	67.6378	4.6404	67.6565
7170	4.6759	67.7686	4.6818	67.7872	4.6877	67.8059	4.6936	67.8246	4.6995	67.8432
7180	4.7349	67.9552	4.7408	67.9739	4.7467	67.9925	4.7526	68.0112	4.7585	68.0298
7190	4.7939	68.1418	4.7998	68.1604	4.8057	68.1790	4.8116	68.1977	4.8175	68.2163
7200	4.8528	68.3282	4.8587	68.3468	4.8646	68.3654	4.8705	68.3841	4.8764	68.4027
7210	4.9117	68.5144	4.9176	68.5331	4.9235	68.5517	4.9294	68.5703	4.9353	68.5889
7220	4.9706	68.7006	4.9765	68.7192	4.9824	68.7378	4.9882	68.7564	4.9941	68.7750
7230	5.0294	68.8866	5.0353	68.9052	5.0412	68.9238	5.0470	68.9424	5.0529	68.9610
7240	5.0882	69.0725	5.0941	69.0911	5.0999	69.1096	5.1058	69.1282	5.1117	69.1468
7250	5.1469	69.2582	5.1528	69.2768	5.1587	69.2954	5.1645	69.3139	5.1704	69.3325
7260	5.2056	69.4439	5.2115	69.4624	5.2174	69.4810	5.2232	69.4995	5.2291	69.5181
7270	5.2643	69.6294	5.2702	69.6479	5.2760	69.6665	5.2819	69.6850	5.2877	69.7035
7280	5.3229	69.8148	5.3288	69.8333	5.3346	69.8518	5.3405	69.8703	5.3464	69.8889
7290	5.3815	70.0000	5.3874	70.0185	5.3932	70.0370	5.3991	70.0556	5.4049	70.0741
	80+	200+	80+	200+	80+	200+	80+	200+	80+	200+

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
80+	200+	80+	200+	80+	200+	80+	200+	80+	200+	
2.7949	61.8206	2.8010	61.8396	2.8070	61.8587	2.8130	61.8778	2.8191	61.8969	6850
2.8553	62.0116	2.8613	62.0305	2.8674	62.0496	2.8734	62.0687	2.8794	62.0878	6860
2.9156	62.2022	2.9217	62.2213	2.9277	62.2403	2.9337	62.2594	2.9397	62.2785	6870
2.9759	62.3928	2.9819	62.4119	2.9880	62.4309	2.9940	62.4500	3.0000	62.4690	6880
3.0361	62.5833	3.0422	62.6024	3.0482	62.6214	3.0542	62.6404	3.0602	62.6595	6890
3.0963	62.7737	3.1023	62.7927	3.1084	62.8117	3.1144	62.8307	3.1204	62.8498	6900
3.1565	62.9639	3.1625	62.9829	3.1685	63.0019	3.1745	63.0209	3.1805	63.0399	6910
3.2166	63.1539	3.2226	63.1729	3.2286	63.1919	3.2346	63.2109	3.2406	63.2299	6920
3.2766	63.3439	3.2827	63.3629	3.2887	63.3819	3.2947	63.4008	3.3007	63.4198	6930
3.3367	63.5337	3.3427	63.5527	3.3487	63.5716	3.3547	63.5906	3.3607	63.6096	6940
3.3966	63.7233	3.4026	63.7423	3.4086	63.7613	3.4146	63.7802	3.4206	63.7992	6950
3.4566	63.9129	3.4626	63.9318	3.4686	63.9508	3.4745	63.9697	3.4805	63.9886	6960
3.5165	64.1023	3.5225	64.1212	3.5284	64.1401	3.5344	64.1590	3.5404	64.1780	6970
3.5763	64.2915	3.5823	64.3104	3.5883	64.3293	3.5943	64.3483	3.6002	64.3672	6980
3.6361	64.4806	3.6421	64.4995	3.6481	64.5184	3.6541	64.5373	3.6600	64.5562	6990
3.6959	64.6696	3.7019	64.6885	3.7078	64.7074	3.7138	64.7263	3.7198	64.7452	7000
3.7556	64.8585	3.7616	64.8773	3.7675	64.8962	3.7735	64.9151	3.7795	64.9340	7010
3.8153	65.0472	3.8212	65.0660	3.8272	65.0849	3.8332	65.1038	3.8391	65.1226	7020
3.8749	65.2357	3.8809	65.2546	3.8868	65.2734	3.8928	65.2923	3.8987	65.3111	7030
3.9345	65.4242	3.9405	65.4430	3.9464	65.4619	3.9524	65.4807	3.9583	65.4995	7040
3.9940	65.6125	4.0000	65.6313	4.0060	65.6501	4.0119	65.6690	4.0179	65.6878	7050
4.0536	65.8007	4.0595	65.8195	4.0655	65.8383	4.0714	65.8571	4.0773	65.8759	7060
4.1130	65.9887	4.1190	66.0075	4.1249	66.0263	4.1309	66.0451	4.1368	66.0639	7070
4.1724	66.1766	4.1784	66.1954	4.1843	66.2142	4.1903	66.2330	4.1962	66.2518	7080
4.2318	66.3644	4.2378	66.3832	4.2437	66.4020	4.2496	66.4207	4.2556	66.4395	7090
4.2912	66.5521	4.2971	66.5708	4.3030	66.5896	4.3090	66.6083	4.3149	66.6271	7100
4.3505	66.7396	4.3564	66.7583	4.3623	66.7771	4.3682	66.7958	4.3742	66.8145	7110
4.4097	66.9270	4.4156	66.9457	4.4216	66.9644	4.4275	66.9831	4.4334	67.0019	7120
4.4689	67.1142	4.4748	67.1329	4.4808	67.1516	4.4867	67.1704	4.4926	67.1891	7130
4.5281	67.3013	4.5340	67.3200	4.5399	67.3387	4.5458	67.3574	4.5518	67.3761	7140
4.5872	67.4883	4.5931	67.5070	4.5991	67.5257	4.6050	67.5444	4.6109	67.5631	7150
4.6463	67.6752	4.6522	67.6939	4.6581	67.7125	4.6640	67.7312	4.6699	67.7499	7160
4.7054	67.8619	4.7113	67.8806	4.7172	67.8992	4.7231	67.9179	4.7290	67.9366	7170
4.7644	68.0485	4.7703	68.0672	4.7762	68.0858	4.7821	68.1045	4.7880	68.1231	7180
4.8233	68.2350	4.8292	68.2536	4.8351	68.2723	4.8410	68.2909	4.8469	68.3095	7190
4.8823	68.4213	4.8882	68.4399	4.8941	68.4586	4.8999	68.4772	4.9058	68.4958	7200
4.9412	68.6075	4.9470	68.6261	4.9529	68.6447	4.9588	68.6634	4.9647	68.6820	7210
5.0000	68.7936	5.0059	68.8122	5.0118	68.8308	5.0176	68.8494	5.0235	68.8680	7220
5.0588	68.9796	5.0647	68.9981	5.0706	69.0167	5.0764	69.0353	5.0823	69.0539	7230
5.1176	69.1654	5.1234	69.1840	5.1293	69.2025	5.1352	69.2211	5.1411	69.2397	7240
5.1763	69.3511	5.1822	69.3696	5.1880	69.3882	5.1939	69.4068	5.1998	69.4253	7250
5.2350	69.5366	5.2408	69.5552	5.2467	69.5737	5.2526	69.5923	5.2584	69.6108	7260
5.2936	69.7221	5.2995	69.7406	5.3053	69.7592	5.3112	69.7777	5.3171	69.7962	7270
5.3522	69.9074	5.3581	69.9259	5.3639	69.9444	5.3698	69.9630	5.3756	69.9815	7280
5.4108	70.0926	5.4166	70.1111	5.4225	70.1296	5.4283	70.1481	5.4342	70.1666	7290
80+	200+	80+	200+	80+	200+	80+	200+	80+	200+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	80+	200+	80+	200+	80+	200+	80+	200+	80+	200+
7300	5.4400	70.1851	5.4459	70.2036	5.4517	70.2221	5.4576	70.2406	5.4634	70.2591
7310	5.4985	70.3701	5.5044	70.3886	5.5102	70.4071	5.5161	70.4256	5.5219	70.4441
7320	5.5570	70.5550	5.5628	70.5735	5.5687	70.5919	5.5745	70.6104	5.5804	70.6289
7330	5.6154	70.7397	5.6213	70.7582	5.6271	70.7767	5.6329	70.7951	5.6388	70.8136
7340	5.6738	70.9243	5.6796	70.9428	5.6855	70.9613	5.6913	70.9797	5.6971	70.9982
7350	5.7321	71.1088	5.7380	71.1273	5.7438	71.1457	5.7496	71.1642	5.7555	71.1826
7360	5.7904	71.2932	5.7963	71.3116	5.8021	71.3301	5.8079	71.3485	5.8138	71.3669
7370	5.8487	71.4774	5.8545	71.4959	5.8604	71.5143	5.8662	71.5327	5.8720	71.5511
7380	5.9069	71.6616	5.9127	71.6800	5.9186	71.6984	5.9244	71.7168	5.9302	71.7352
7390	5.9651	71.8455	5.9709	71.8639	5.9767	71.8823	5.9826	71.9007	5.9884	71.9191
7400	6.0233	72.0294	6.0291	72.0478	6.0349	72.0662	6.0407	72.0845	6.0465	72.1029
7410	6.0814	72.2132	6.0872	72.2315	6.0930	72.2499	6.0988	72.2683	6.1046	72.2866
7420	6.1394	72.3968	6.1452	72.4151	6.1510	72.4335	6.1568	72.4518	6.1626	72.4702
7430	6.1974	72.5803	6.2032	72.5986	6.2090	72.6169	6.2148	72.6353	6.2206	72.6536
7440	6.2554	72.7636	6.2612	72.7820	6.2670	72.8003	6.2728	72.8186	6.2786	72.8369
7450	6.3134	72.9469	6.3192	72.9652	6.3250	72.9835	6.3308	73.0018	6.3366	73.0201
7460	6.3713	73.1300	6.3771	73.1483	6.3829	73.1666	6.3887	73.1849	6.3944	73.2032
7470	6.4292	73.3130	6.4349	73.3313	6.4407	73.3496	6.4465	73.3679	6.4523	73.3862
7480	6.4870	73.4959	6.4928	73.5142	6.4986	73.5324	6.5043	73.5507	6.5101	73.5690
7490	6.5448	73.6786	6.5506	73.6969	6.5563	73.7152	6.5621	73.7334	6.5679	73.7517
7500	6.6025	73.8613	6.6083	73.8795	6.6141	73.8978	6.6199	73.9160	6.6256	73.9343
7510	6.6603	74.0438	6.6660	74.0620	6.6718	74.0803	6.6776	74.0985	6.6833	74.1168
7520	6.7179	74.2262	6.7237	74.2444	6.7295	74.2626	6.7352	74.2809	6.7410	74.2991
7530	6.7756	74.4085	6.7813	74.4267	6.7871	74.4449	6.7929	74.4631	6.7986	74.4813
7540	6.8332	74.5906	6.8389	74.6088	6.8447	74.6270	6.8504	74.6452	6.8562	74.6634
7550	6.8907	74.7726	6.8965	74.7908	6.9022	74.8090	6.9080	74.8272	6.9138	74.8454
7560	6.9483	74.9545	6.9540	74.9727	6.9598	74.9909	6.9655	75.0091	6.9713	75.0273
7570	7.0057	75.1363	7.0115	75.1545	7.0172	75.1727	7.0230	75.1908	7.0287	75.2090
7580	7.0632	75.3180	7.0689	75.3362	7.0747	75.3543	7.0804	75.3725	7.0862	75.3906
7590	7.1206	75.4995	7.1263	75.5177	7.1321	75.5358	7.1378	75.5540	7.1436	75.5721
7600	7.1780	75.6810	7.1837	75.6991	7.1894	75.7172	7.1952	75.7354	7.2009	75.7535
7610	7.2353	75.8623	7.2410	75.8804	7.2468	75.8985	7.2525	75.9167	7.2582	75.9348
7620	7.2926	76.0435	7.2983	76.0616	7.3041	76.0797	7.3098	76.0978	7.3155	76.1159
7630	7.3499	76.2245	7.3556	76.2426	7.3613	76.2607	7.3670	76.2788	7.3728	76.2969
7640	7.4071	76.4055	7.4128	76.4236	7.4185	76.4417	7.4243	76.4598	7.4300	76.4778
7650	7.4643	76.5863	7.4700	76.6044	7.4757	76.6225	7.4814	76.6406	7.4871	76.6586
7660	7.5214	76.7671	7.5271	76.7851	7.5329	76.8032	7.5386	76.8212	7.5443	76.8393
7670	7.5785	76.9476	7.5842	76.9657	7.5900	76.9838	7.5957	77.0018	7.6014	77.0199
7680	7.6356	77.1281	7.6413	77.1462	7.6470	77.1642	7.6527	77.1823	7.6584	77.2003
7690	7.6926	77.3085	7.6983	77.3265	7.7040	77.3446	7.7097	77.3626	7.7154	77.3806
7700	7.7496	77.4887	7.7553	77.5068	7.7610	77.5248	7.7667	77.5228	7.7724	77.5608
7710	7.8066	77.6689	7.8123	77.6869	7.8180	77.7049	7.8237	77.7229	7.8294	77.7409
7720	7.8635	77.8489	7.8692	77.8669	7.8749	77.8849	7.8806	77.9029	7.8863	77.9209
7730	7.9204	78.0288	7.9261	78.0468	7.9318	78.0647	7.9375	78.0827	7.9432	78.1007
7740	7.9773	78.2086	7.9830	78.2265	7.9886	78.2445	7.9943	78.2625	8.0000	78.2804
	80+	200+	80+	200+	80+	200+	80+	200+	80+	200+

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
80+	200+	80+	200+	80+	200+	80+	200+	80+	200+	
5.4693	70.2776	5.4751	70.2961	5.4810	70.3146	5.4868	70.3331	5.4927	70.3516	7300
5.5278	70.4626	5.5336	70.4811	5.5395	70.4995	5.5453	70.5180	5.5512	70.5365	7310
5.5862	70.6474	5.5921	70.6658	5.5979	70.6843	5.6037	70.7028	5.6096	70.7213	7320
5.6446	70.8321	5.6505	70.8505	5.6563	70.8690	5.6621	70.8874	5.6680	70.9059	7330
5.7030	71.0166	5.7088	71.0351	5.7146	71.0535	5.7205	71.0719	5.7263	71.0904	7340
5.7613	71.2010	5.7671	71.2195	5.7730	71.2379	5.7788	71.2563	5.7846	71.2748	7350
5.8196	71.3853	5.8254	71.4038	5.8312	71.4222	5.8371	71.4406	5.8429	71.4590	7360
5.8778	71.5695	5.8836	71.5879	5.8895	71.6063	5.8953	71.6247	5.9011	71.6431	7370
5.9360	71.7536	5.9418	71.7720	5.9477	71.7904	5.9535	71.8088	5.9593	71.8272	7380
5.9942	71.9375	6.0000	71.9559	6.0058	71.9743	6.0116	71.9926	6.0174	72.0110	7390
6.0523	72.1213	6.0581	72.1397	6.0639	72.1580	6.0697	72.1764	6.0755	72.1948	7400
6.1104	72.3050	6.1162	72.3233	6.1220	72.3417	6.1278	72.3601	6.1336	72.3784	7410
6.1684	72.4885	6.1742	72.5069	6.1800	72.5252	6.1858	72.5436	6.1916	72.5619	7420
6.2264	72.6720	6.2322	72.6903	6.2380	72.7086	6.2438	72.7270	6.2496	72.7453	7430
6.2844	72.8553	6.2902	72.8736	6.2960	72.8919	6.3018	72.9102	6.3076	72.9286	7440
6.3423	73.0385	6.3481	73.0568	6.3539	73.0751	6.3597	73.0934	6.3655	73.1117	7450
6.4002	73.2215	6.4060	73.2398	6.4118	73.2581	6.4176	73.2764	6.4234	73.2947	7460
6.4581	73.4045	6.4639	73.4228	6.4696	73.4410	6.4754	73.4593	6.4812	73.4776	7470
6.5159	73.5873	6.5217	73.6056	6.5275	73.6238	6.5332	73.6421	6.5390	73.6604	7480
6.5737	73.7700	6.5794	73.7882	6.5852	73.8065	6.5910	73.8248	6.5968	73.8430	7490
6.6314	73.9526	6.6372	73.9708	6.6429	73.9891	6.6487	74.0073	6.6545	74.0255	7500
6.6891	74.1350	6.6949	74.1532	6.7006	74.1715	6.7064	74.1897	6.7122	74.2080	7510
6.7468	74.3173	6.7525	74.3356	6.7583	74.3538	6.7640	74.3720	6.7698	74.3902	7520
6.8044	74.4995	6.8101	74.5178	6.8159	74.5360	6.8217	74.5542	6.8274	74.5724	7530
6.8620	74.6816	6.8677	74.6998	6.8735	74.7180	6.8792	74.7362	6.8850	74.7544	7540
6.9195	74.8636	6.9253	74.8818	6.9310	74.9000	6.9368	74.9182	6.9425	74.9364	7550
6.9770	75.0455	6.9828	75.0636	6.9885	75.0818	6.9943	75.1000	7.0000	75.1182	7560
7.0345	75.2272	7.0402	75.2453	7.0460	75.2635	7.0517	75.2817	7.0575	75.2998	7570
7.0919	75.4088	7.0976	75.4269	7.1034	75.4451	7.1091	75.4632	7.1149	75.4814	7580
7.1493	75.5903	7.1550	75.6084	7.1608	75.6266	7.1665	75.6447	7.1722	75.6628	7590
7.2067	75.7716	7.2124	75.7898	7.2181	75.8079	7.2239	75.8260	7.2296	75.8442	7600
7.2640	75.9529	7.2697	75.9710	7.2754	75.9891	7.2812	76.0072	7.2869	76.0254	7610
7.3212	76.1340	7.3270	76.1521	7.3327	76.1702	7.3384	76.1883	7.3441	76.2064	7620
7.3785	76.3150	7.3842	76.3331	7.3899	76.3512	7.3957	76.3693	7.4014	76.3874	7630
7.4357	76.4959	7.4414	76.5140	7.4471	76.5321	7.4528	76.5502	7.4586	76.5683	7640
7.4929	76.6767	7.4986	76.6948	7.5043	76.7128	7.5100	76.7309	7.5157	76.7490	7650
7.5500	76.8574	7.5557	76.8754	7.5614	76.8935	7.5671	76.9115	7.5728	76.9296	7660
7.6071	77.0379	7.6128	77.0560	7.6185	77.0740	7.6242	77.0920	7.6299	77.1101	7670
7.6641	77.2183	7.6698	77.2364	7.6755	77.2544	7.6812	77.2724	7.6869	77.2905	7680
7.7211	77.3986	7.7268	77.4167	7.7325	77.4347	7.7382	77.4527	7.7439	77.4707	7690
7.7781	77.5788	7.7838	77.5968	7.7895	77.6148	7.7952	77.6329	7.8009	77.6509	7700
7.8351	77.7589	7.8408	77.7769	7.8465	77.7949	7.8521	77.8129	7.8578	77.8309	7710
7.8920	77.9388	7.8977	77.9568	7.9034	77.9748	7.9090	77.9928	7.9147	78.0108	7720
7.9488	78.1187	7.9545	78.1367	7.9602	78.1546	7.9659	78.1726	7.9716	78.1906	7730
8.0057	78.2984	8.0114	78.3164	8.0170	78.3343	8.0227	78.3523	8.0284	78.3703	7740
80+	200+	80+	200+	80+	200+	80+	200+	80+	200+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	80+	200+	80+	200+	80+	200+	80+	200+	80+	200+
7750	8.0341	78.3882	8.0398	78.4062	8.0454	78.4241	8.0511	78.4421	8.0568	78.4601
7760	8.0909	78.5678	8.0965	78.5857	8.1022	78.6037	8.1079	78.6216	8.1136	78.6396
7770	8.1476	78.7472	8.1533	78.7651	8.1589	78.7831	8.1646	78.8010	8.1703	78.8189
7780	8.2043	78.9265	8.2100	78.9444	8.2156	78.9624	8.2213	78.9803	8.2270	78.9982
7790	8.2610	79.1057	8.2666	79.1236	8.2723	79.1415	8.2780	79.1595	8.2836	79.1774
7800	8.3176	79.2848	8.3233	79.3027	8.3289	79.3206	8.3346	79.3385	8.3403	79.3564
7810	8.3742	79.4638	8.3799	79.4817	8.3855	79.4996	8.3912	79.5174	8.3968	79.5353
7820	8.4308	79.6426	8.4364	79.6605	8.4421	79.6784	8.4477	79.6963	8.4534	79.7141
7830	8.4873	79.8214	8.4929	79.8392	8.4986	79.8571	8.5042	79.8750	8.5099	79.8928
7840	8.5438	80.0000	8.5494	80.0179	8.5551	80.0357	8.5607	80.0536	8.5664	80.0714
7850	8.6002	80.1785	8.6059	80.1964	8.6115	80.2142	8.6172	80.2320	8.6228	80.2499
7860	8.6566	80.3569	8.6623	80.3747	8.6679	80.3926	8.6736	80.4104	8.6792	80.4282
7870	8.7130	80.5352	8.7187	80.5530	8.7243	80.5708	8.7299	80.5887	8.7356	80.6065
7880	8.7694	80.7134	8.7750	80.7312	8.7806	80.7490	8.7863	80.7668	8.7919	80.7846
7890	8.8257	80.8914	8.8313	80.9092	8.8369	80.9270	8.8426	80.9448	8.8482	80.9626
7900	8.8819	81.0694	8.8876	81.0872	8.8932	81.1050	8.8988	81.1227	8.9044	81.1405
7910	8.9382	81.2472	8.9438	81.2650	8.9494	81.2828	8.9550	81.3006	8.9607	81.3183
7920	8.9944	81.4249	9.0000	81.4427	9.0056	81.4605	9.0112	81.4782	9.0169	81.4960
7930	9.0505	81.6026	9.0562	81.6203	9.0618	81.6381	9.0674	81.6558	9.0730	81.6736
7940	9.1067	81.7800	9.1123	81.7978	9.1180	81.8155	9.1235	81.8333	9.1291	81.8510
7950	9.1628	81.9574	9.1684	81.9752	9.1740	81.9929	9.1796	82.0106	9.1852	82.0284
7960	9.2188	82.1347	9.2244	82.1524	9.2300	82.1702	9.2356	82.1879	9.2412	82.2056
7970	9.2749	82.3119	9.2805	82.3296	9.2861	82.3473	9.2917	82.3650	9.2973	82.3827
7980	9.3308	82.4889	9.3364	82.5066	9.3420	82.5243	9.3476	82.5420	9.3532	82.5597
7990	9.3868	82.6659	9.3924	82.6836	9.3980	82.7013	9.4036	82.7189	9.4092	82.7366
8000	9.4427	82.8427	9.4483	82.8604	9.4539	82.8781	9.4595	82.8957	9.4651	82.9134
8010	9.4986	83.0194	9.5042	83.0371	9.5098	83.0548	9.5154	83.0724	9.5209	83.0901
8020	9.5545	83.1960	9.5600	83.2137	9.5656	83.2314	9.5712	83.2490	9.5768	83.2667
8030	9.6103	83.3725	9.6158	83.3902	9.6214	83.4078	9.6270	83.4255	9.6326	83.4431
8040	9.6660	83.5489	9.6716	83.5666	9.6772	83.5842	9.6828	83.6018	9.6883	83.6195
8050	9.7218	83.7252	9.7274	83.7428	9.7329	83.7605	9.7385	83.7781	9.7441	83.7957
8060	9.7775	83.9014	9.7831	83.9190	9.7886	83.9366	9.7942	83.9542	9.7998	83.9718
8070	9.8332	84.0775	9.8387	84.0951	9.8443	84.1127	9.8499	84.1303	9.8554	84.1478
8080	9.8888	84.2534	9.8944	84.2710	9.8999	84.2886	9.9055	84.3062	9.9111	84.3238
8090	9.9444	84.4293	9.9500	84.4468	9.9555	84.4644	9.9611	84.4820	9.9667	84.4996
8100	*0.0000	84.6050	*0.0056	84.6226	*0.0111	84.6401	*0.0167	84.6577	*0.0222	84.6753
8110	0.0555	84.7806	0.0611	84.7982	0.0666	84.8157	0.0722	84.8333	0.0777	84.8508
8120	0.1110	84.9561	0.1166	84.9737	0.1221	84.9912	0.1277	85.0088	0.1332	85.0263
8130	0.1665	85.1316	0.1721	85.1491	0.1776	85.1666	0.1831	85.1842	0.1887	85.2017
8140	0.2219	85.3069	0.2275	85.3244	0.2330	85.3419	0.2386	85.3594	0.2441	85.3769
8150	0.2774	85.4820	0.2829	85.4996	0.2884	85.5171	0.2940	85.5346	0.2995	85.5521
8160	0.3327	85.6571	0.3383	85.6746	0.3438	85.6921	0.3493	85.7096	0.3549	85.7271
8170	0.3881	85.8321	0.3936	85.8496	0.3991	85.8671	0.4046	85.8846	0.4102	85.9021
8180	0.4434	86.0070	0.4489	86.0245	0.4544	86.0420	0.4599	86.0594	0.4655	86.0769
8190	0.4986	86.1818	0.5041	86.1992	0.5097	86.2167	0.5152	86.2342	0.5207	86.2516
	90+	200+	90+	200+	90+	200+	90+	200+	90+	200+

SQUARE ROOTS

5		6		7		8		9		
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	N
80+	200+	80+	200+	80+	200+	80+	200+	80+	200+	
8.0625	78.4780	8.0682	78.4960	8.0738	78.5139	8.0795	78.5319	8.0852	78.5498	7750
8.1192	78.6575	8.1249	78.6754	8.1306	78.6934	8.1363	78.7113	8.1419	78.7293	7760
8.1760	78.8369	8.1816	78.8548	8.1873	78.8727	8.1930	78.8907	8.1986	78.9086	7770
8.2326	79.0161	8.2383	79.0340	8.2440	79.0520	8.2496	79.0699	8.2553	79.0878	7780
8.2893	79.1953	8.2950	79.2132	8.3006	79.2311	8.3063	79.2490	8.3119	79.2669	7790
8.3459	79.3743	8.3516	79.3922	8.3572	79.4101	8.3629	79.4280	8.3685	79.4459	7800
8.4025	79.5532	8.4081	79.5711	8.4139	79.5890	8.4195	79.6069	8.4251	79.6247	7810
8.4590	79.7320	8.4647	79.7499	8.4703	79.7678	8.4760	79.7856	8.4816	79.8035	7820
8.5155	79.9107	8.5212	79.9286	8.5268	79.9464	8.5325	79.9643	8.5381	79.9821	7830
8.5720	80.0893	8.5777	80.1071	8.5833	80.1250	8.5889	80.1428	8.5946	80.1607	7840
8.6284	80.2677	8.6341	80.2856	8.6397	80.3034	8.6454	80.3212	8.6510	80.3391	7850
8.6848	80.4461	8.6905	80.4639	8.6961	80.4817	8.7017	80.4996	8.7074	80.5174	7860
8.7412	80.6243	8.7468	80.6421	8.7525	80.6599	8.7581	80.6778	8.7637	80.6956	7870
8.7975	80.8024	8.8032	80.8202	8.8088	80.8380	8.8144	80.8558	8.8200	80.8736	7880
8.8538	80.9804	8.8594	80.9982	8.8651	81.0160	8.8707	81.0338	8.8763	81.0516	7890
8.9101	81.1583	8.9157	81.1761	8.9213	81.1939	8.9269	81.2117	8.9326	81.2294	7900
8.9663	81.3361	8.9719	81.3539	8.9775	81.3716	8.9831	81.3894	8.9888	81.4072	7910
9.0225	81.5138	9.0281	81.5315	9.0337	81.5493	9.0393	81.5670	9.0449	81.5848	7920
9.0786	81.6913	9.0842	81.7091	9.0898	81.7268	9.0955	81.7446	9.1011	81.7623	7930
9.1347	81.8688	9.1403	81.8865	9.1459	81.9042	9.1516	81.9220	9.1572	81.9397	7940
9.1908	82.0461	9.1964	82.0638	9.2020	82.0815	9.2076	82.0993	9.2132	82.1170	7950
9.2468	82.2233	9.2525	82.2410	9.2581	82.2587	9.2637	82.2765	9.2693	82.2942	7960
9.3029	82.4004	9.3085	82.4181	9.3141	82.4358	9.3197	82.4535	9.3252	82.4712	7970
9.3588	82.5774	9.3644	82.5951	9.3700	82.6128	9.3756	82.6305	9.3812	82.6482	7980
9.4148	82.7543	9.4204	82.7720	9.4259	82.7897	9.4315	82.8074	9.4371	82.8250	7990
9.4707	88.9311	9.4763	82.9488	9.4818	82.9664	9.4874	82.9841	9.4930	83.0018	8000
9.5265	83.1078	9.5321	83.1254	9.5377	83.1431	9.5433	83.1607	9.5489	83.1784	8010
9.5824	83.2843	9.5879	83.3020	9.5935	83.3196	9.5991	83.3373	9.6047	83.3549	8020
9.6382	83.4608	9.6437	83.4784	9.6493	83.4960	9.6549	83.5137	9.6605	83.5313	8030
9.6939	83.6371	9.6995	83.6547	9.7051	83.6723	9.7106	83.6900	9.7162	83.7076	8040
9.7497	83.8133	9.7552	83.8309	9.7608	83.8486	9.7664	83.8662	9.7719	83.8838	8050
9.8053	83.9894	9.8109	84.0070	9.8165	84.0246	9.8220	84.0423	9.8276	84.0599	8060
9.8610	84.1654	9.8666	84.1830	9.8721	84.2006	9.8777	84.2182	9.8833	84.2358	8070
9.9166	84.3413	9.9222	84.3589	9.9277	84.3765	9.9333	84.3941	9.9389	84.4117	8080
9.9722	84.5171	9.9778	84.5347	9.9833	84.5523	9.9889	84.5699	9.9944	84.5874	8090
0.0278	84.6928	*0.0333	84.7104	*0.0389	84.7279	*0.0444	84.7455	*0.0500	84.7631	8100
0.0833	84.8684	0.0888	84.8859	0.0944	84.9035	0.0999	84.9210	0.1055	84.9386	8110
0.1388	85.0439	0.1443	85.0614	0.1499	85.0789	0.1554	85.0965	0.1610	85.1140	8120
0.1942	85.2192	0.1998	85.2367	0.2053	85.2543	0.2109	85.2718	0.2164	85.2893	8130
0.2497	85.3945	0.2552	85.4120	0.2607	85.4295	0.2663	85.4470	0.2718	85.4645	8140
0.3050	85.5696	0.3106	85.5871	0.3161	85.6046	0.3216	85.6221	0.3272	85.6396	8150
0.3604	85.7446	0.3659	85.7621	0.3715	85.7796	0.3770	85.7971	0.3825	85.8146	8160
0.4157	85.9196	0.4212	85.9371	0.4268	85.9545	0.4323	85.9720	0.4378	85.9895	8170
0.4710	86.0944	0.4765	86.1119	0.4820	86.1293	0.4876	86.1468	0.4931	86.1643	8180
0.5262	86.2691	0.5318	86.2866	0.5373	86.3040	0.5428	86.3215	0.5483	86.3390	8190
90+	200+	90+	200+	90+	200+	90+	200+	90+	200+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	90+	200+	90+	200+	90+	200+	90+	200+	90+	200+
8200	0.5539	86.3564	0.5594	86.3739	0.5649	86.3913	0.5704	86.4088	0.5759	86.4263
8210	0.6091	86.5310	0.6146	86.5484	0.6201	86.5659	0.6256	86.5833	0.6311	86.6008
8220	0.6642	86.7054	0.6697	86.7229	0.6752	86.7403	0.6808	86.7577	0.6863	86.7752
8230	0.7193	86.8798	0.7249	86.8972	0.7304	86.9146	0.7359	86.9320	0.7414	86.9495
8240	0.7744	87.0540	0.7800	87.0714	0.7855	87.0888	0.7910	87.1063	0.7965	87.1237
8250	0.8295	87.2281	0.8350	87.2455	0.8405	87.2629	0.8460	87.2804	0.8515	87.2978
8260	0.8845	87.4022	0.8900	87.4196	0.8955	87.4370	0.9010	87.4543	0.9065	87.4717
8270	0.9395	87.5761	0.9450	87.5935	0.9505	87.6108	0.9560	87.6282	0.9615	87.6456
8280	0.9945	87.7499	1.0000	87.7673	1.0055	87.7846	1.0110	87.8020	1.0165	87.8194
8290	1.0494	87.9236	1.0549	87.9410	1.0604	87.9583	1.0659	87.9757	1.0714	87.9931
8300	1.1043	88.0972	1.1098	88.1146	1.1153	88.1319	1.1208	88.1493	1.1263	88.1666
8310	1.1592	88.2707	1.1647	88.2881	1.1702	88.3054	1.1757	88.3227	1.1811	88.3401
8320	1.2140	88.4441	1.2195	88.4614	1.2250	88.4788	1.2305	88.4961	1.2360	88.5134
8330	1.2688	88.6174	1.2743	88.6347	1.2798	88.6520	1.2853	88.6694	1.2907	88.6867
8340	1.3236	88.7906	1.3291	88.8079	1.3346	88.8252	1.3400	88.8425	1.3455	88.8598
8350	1.3783	88.9637	1.3838	88.9810	1.3893	88.9983	1.3947	89.0156	1.4002	89.0329
8360	1.4330	89.1366	1.4385	89.1539	1.4440	89.1712	1.4494	89.1885	1.4550	89.2058
8370	1.4877	89.3095	1.4932	89.3268	1.4986	89.3441	1.5041	89.3614	1.5096	89.3786
8380	1.5423	89.4823	1.5478	89.4996	1.5533	89.5168	1.5587	89.5341	1.5642	89.5514
8390	1.5969	89.6550	1.6024	89.6722	1.6079	89.6895	1.6133	89.7067	1.6188	89.7240
8400	1.6515	89.8275	1.6570	89.8448	1.6624	89.8620	1.6679	89.8793	1.6733	89.8965
8410	1.7061	90.0000	1.7115	90.0172	1.7170	90.0345	1.7224	90.0517	1.7279	90.0690
8420	1.7606	90.1724	1.7660	90.1896	1.7715	90.2068	1.7769	90.2241	1.7824	90.2413
8430	1.8150	90.3446	1.8205	90.3618	1.8259	90.3791	1.8314	90.3963	1.8368	90.4135
8440	1.8695	90.5168	1.8749	90.5340	1.8804	90.5512	1.8858	90.5684	1.8912	90.5856
8450	1.9239	90.6888	1.9293	90.7060	1.9348	90.7232	1.9402	90.7404	1.9456	90.7576
8460	1.9783	90.8608	1.9837	90.8780	1.9891	90.8952	1.9946	90.9124	2.0000	90.9295
8470	2.0326	91.0326	2.0380	91.0498	2.0435	91.0670	2.0489	91.0842	2.0543	91.1014
8480	2.0869	91.2044	2.0923	91.2216	2.0978	91.2387	2.1032	91.2559	2.1086	91.2731
8490	2.1412	91.3760	2.1466	91.3932	2.1520	91.4104	2.1575	91.4275	2.1629	91.4447
8500	2.1954	91.5476	2.2009	91.5647	2.2063	91.5819	2.2117	91.5990	2.2171	91.6162
8510	2.2497	91.7190	2.2551	91.7362	2.2605	91.7533	2.2659	91.7705	2.2713	91.7876
8520	2.3038	91.8904	2.3093	91.9075	2.3147	91.9246	2.3201	91.9418	2.3255	91.9589
8530	2.3580	92.0616	2.3634	92.0788	2.3688	92.0959	2.3742	92.1130	2.3797	92.1301
8540	2.4121	92.2328	2.4175	92.2499	2.4229	92.2670	2.4284	92.2841	2.4338	92.3012
8550	2.4662	92.4038	2.4716	92.4209	2.4770	92.4380	2.4824	92.4551	2.4878	92.4722
8560	2.5203	92.5748	2.5257	92.5919	2.5311	92.6090	2.5365	92.6260	2.5419	92.6431
8570	2.5743	92.7456	2.5797	92.7627	2.5851	92.7798	2.5905	92.7969	2.5959	92.8139
8580	2.6283	92.9164	2.6337	92.9334	2.6391	92.9505	2.6445	92.9676	2.6499	92.9846
8590	2.6823	93.0870	2.6876	93.1041	2.6930	93.1211	2.6984	93.1382	2.7038	93.1552
8600	2.7362	93.2576	2.7416	93.2746	2.7470	93.2917	2.7524	93.3087	2.7577	93.3258
8610	2.7901	93.4280	2.7955	93.4451	2.8009	93.4621	2.8063	93.4791	2.8116	93.4962
8620	2.8440	93.5984	2.8493	93.6154	2.8547	93.6324	2.8601	93.6495	2.8655	93.6665
8630	2.8978	93.7686	2.9032	93.7856	2.9086	93.8027	2.9139	93.8197	2.9193	93.8367
8640	2.9516	93.9388	2.9570	93.9558	2.9624	93.9729	2.9677	93.9898	2.9731	94.0068
	90+	200+	90+	200+	90+	200+	90+	200+	90+	200+

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
90+	200+	90+	200+	90+	200+	90+	200+	90+	200+	
0.5815	86.4437	0.5870	86.4612	0.5925	86.4786	0.5980	86.4961	0.6035	86.5135	8200
0.6366	86.6182	0.6422	86.6357	0.6477	86.6531	0.6532	86.6705	0.6587	86.6880	8210
0.6918	86.7926	0.6973	86.8100	0.7028	86.8275	0.7083	86.8449	0.7138	86.8623	8220
0.7469	86.9669	0.7524	86.9843	0.7579	87.0017	0.7634	87.0192	0.7689	87.0366	8230
0.8020	87.1411	0.8075	87.1585	0.8130	87.1759	0.8185	87.1933	0.8240	87.2107	8240
0.8570	87.3152	0.8625	87.3326	0.8680	87.3500	0.8735	87.3674	0.8790	87.3848	8250
0.9120	87.4891	0.9175	87.5065	0.9230	87.5239	0.9285	87.5413	0.9340	87.5587	8260
0.9670	87.6630	0.9725	87.6804	0.9780	87.6978	0.9835	87.7151	0.9890	87.7325	8270
1.0220	87.8368	1.0275	87.8541	1.0330	87.8715	1.0385	87.8889	1.0439	87.9062	8280
1.0769	88.0104	1.0824	88.0278	1.0879	88.0451	1.0934	88.0625	1.0988	88.0799	8290
1.1318	88.1840	1.1373	88.2013	1.1427	88.2187	1.1482	88.2360	1.1537	88.2534	8300
1.1866	88.3574	1.1921	88.3748	1.1976	88.3921	1.2031	88.4094	1.2086	88.4268	8310
1.2414	88.5308	1.2469	88.5481	1.2524	88.5654	1.2579	88.5827	1.2634	88.6001	8320
1.2962	88.7040	1.3017	88.7213	1.3072	88.7386	1.3127	88.7560	1.3181	88.7733	8330
1.3510	88.8771	1.3564	88.8944	1.3619	88.9118	1.3674	88.9291	1.3729	88.9464	8340
1.4057	89.0502	1.4112	89.0675	1.4166	89.0848	1.4221	89.1021	1.4276	89.1194	8350
1.4604	89.2231	1.4658	89.2404	1.4713	89.2577	1.4768	89.2750	1.4822	89.2922	8360
1.5150	89.3959	1.5205	89.4132	1.5260	89.4305	1.5314	89.4478	1.5369	89.4650	8370
1.5696	89.5686	1.5751	89.5859	1.5806	89.6032	1.5860	89.6204	1.5915	89.6377	8380
1.6242	89.7413	1,6297	89.7585	1.6351	89.7758	1.6406	89.7930	1.6461	89.8103	8390
1.6788	89.9138	1.6842	89.9310	1.6897	89.9483	1.6951	89.9655	1.7006	89.9828	8400
1.7333	90.0862	1.7388	90.1034	1.7442	90.1207	1.7497	90.1379	1.7551	90.1551	8410
1.7878	90.2585	1.7932	90.2757	1.7987	90.2930	1.8041	90.3102	1.8096	90.3274	8420
1.8423	90.4307	1.8477	90.4479	1.8531	90.4651	1.8586	90.4824	1.8640	90.4996	8430
1.8967	90.6028	1.9021	90.6200	1.9076	90.6372	1.9130	90.6544	1.9184	90.6716	8440
1.9511	90.7748	1.9565	90.7920	1.9619	90.8092	1.9674	90.8264	1.9728	90.8436	8450
2.0054	90.9467	2.0109	90.9639	2.0163	90.9811	2.0217	90.9983	2.0272	91.0155	8460
2.0598	91.1185	2.0652	91.1357	2.0706	91.1529	2.0761	91.1701	2.0815	91.1872	8470
2.1141	91.2902	2.1195	91.3074	2.1249	91.3246	2.1303	91.3417	2.1358	91.3589	8480
2.1683	91.4618	2.1737	91.4790	2.1792	91.4961	2.1846	91.5133	2.1900	91.5304	8490
2.2226	91.6333	2.2280	91.6505	2.2334	91.6076	2.2388	91.6848	2.2442	91.7019	8500
2.2768	91.8047	2.2822	91.8219	2.2876	91.8390	2.2930	91.8561	2.2984	91.8733	8510
2.3309	91.9760	2.3363	91.9932	2.3418	92.0103	2.3472	92.0274	2.3526	92.0445	8520
2.3851	92.1472	2.3905	92.1643	2.3959	92,1815	2.4013	92.1986	2.4067	92.2157	8530
2.4392	92.3183	2.4446	92.3354	2.4500	92.3525	2.4554	92.3696	2.4608	92.3867	8540
2.4932	92.4893	2.4986	92.5064	2.5041	92.5235	2.5095	92.5406	2.5149	92.5577	8550
2.5473	92.6602	2.5527	92.6773	2.5581	92.6944	2.5635	92.7115	2.5689	92.7285	8560
2.6013	92.8310	2.6067	92.8481	2.6121	92.8652	2.6175	92.8822	2.6229	92.8993	8570
2.6553	93.0017	2.6607	93.0188	2.6661	93.0358	2.6715	93.0529	2.6769	93.0700	8580
2.7092	93.1723	2.7146	93.1894	2.7200	93.2064	2.7254	93.2235	2.7308	93.2405	8590
2.7631	93.3428	2.7685	93.3598	2,7739	93.3769	2.7793	93.3939	2.7947	93.4110	8600
2.8170	93.5132	2.8224	93.5302	2.8278	93.5473	2.8332	93.5643	2.8386	93.5813	8610
2.8709	93.6835	2.8763	93.7005	2.8816	93.7176	2.8870	93.7346	2.8924	93.7516	8620
2.9247	93.8537	2.9301	93.8707	2.9355	93.8877	2.9408	93.9047	2.9462	93.9218	8630
2.9785	94.0238	2.9839	94.0408	2.9892	94.0578	2.9946	94.0748	3.0000	94.0918	8640
90+	200+	90+	200+	90+	200+	90+	200+	90+	200+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	90+	200+	90+	200+	90+	200+	90+	200+	90+	200+
8650	3.0054	94.1088	3.0108	94.1258	3.0161	94.1428	3.0215	94.1598	3.0269	94.1768
8660	3.0591	94.2788	3.0645	94.2958	3.0699	94.3128	3.0752	94.3297	3.0806	94.3467
8670	3.1128	94.4486	3.1182	94.4656	3.1236	94.4826	3.1289	94.4996	3.1343	94.5166
8680	3.1665	94.6184	3.1719	94.6354	3.1773	94.6523	3.1826	94.6693	3.1880	94.6863
8690	3.2202	94.7881	3.2255	94.8050	3.2309	94.8220	3.2363	94.8389	3.2416	94.8559
8700	3.2738	94.9576	3.2792	94.9746	3.2845	94.9915	3.2899	95.0085	3.2952	95.0254
8710	3.3274	95.1271	3.3327	95.1440	3.3381	95.1610	3.3435	95.1779	3.3488	95.1949
8720	3.3809	95.2965	3.3863	95.3134	3.3916	95.3303	3.3970	95.3473	3.4024	95.3642
8730	3.4345	95.4657	3.4398	95.4827	3.4452	95.4996	3.4505	95.5165	3.4559	95.5334
8740	3.4880	95.6349	3.4933	95.6518	3.4987	95.6687	3.5040	95.6856	3.5094	95.7026
8750	3.5414	95.8040	3.5468	95.8209	3.5521	95.8378	3.5575	95.8547	3.5628	95.8716
8760	3.5949	95.9730	3.6002	95.9899	3.6056	96.0068	3.6109	96.0236	3.6162	96.0405
8770	3.6483	96.1419	3.6536	96.1587	3.6590	96.1756	3.6643	96.1925	3.6696	96.2094
8780	3.7017	96.3106	3.7070	96.3275	3.7123	96.3444	3.7177	96.3613	3.7230	96.3781
8790	3.7550	96.4793	3.7603	96.4962	3.7657	96.5131	3.7710	96.5300	3.7763	96.5468
8800	3.8083	96.6479	3.8136	96.6648	3.8190	96.6816	3.8243	96.6985	3.8296	96.7154
8810	3.8616	96.8164	3.8669	96.8333	3.8723	96.8501	3.8776	96.8670	3.8829	96.8838
8820	3.9149	96.9848	3.9202	97.0017	3.9255	97.0185	3.9308	97.0354	3.9361	97.0522
8830	3.9681	97.1532	3.9734	97.1700	3.9787	97.1868	3.9840	97.2036	3.9894	97.2205
8840	4.0213	97.3214	4.0266	97.3382	4.0319	97.3550	4.0372	97.3718	4.0425	97.3886
8850	4.0744	97.4895	4.0798	97.5063	4.0851	97.5231	4.0904	97.5399	4.0957	97.5567
8860	4.1276	97.6575	4.1329	97.6743	4.1382	97.6911	4.1435	97.7079	4.1488	97.7247
8870	4.1807	97.8255	4.1860	97.8422	4.1913	97.8590	4.1966	97.8758	4.2019	97.8926
8880	4.2338	97.9933	4.2391	98.0101	4.2444	98.0268	4.2497	98.0436	4.2550	98.0604
8890	4.2868	98.1610	4.2921	98.1778	4.2974	98.1946	4.3027	98.2113	4.3080	98.2281
8900	4.3398	98.3287	4.3451	98.3454	4.3504	98.3622	4.3557	98.3790	4.3610	98.3957
8910	4.3928	98.4962	4.3981	98.5130	4.4034	98.5297	4.4087	98.5465	4.4140	98.5632
8920	4.4458	98.6637	4.4510	98.6804	4.4563	98.6972	4.4616	98.7139	4.4669	98.7306
8930	4.4987	98.8311	4.5040	98.8478	4.5093	98.8645	4.5145	98.8812	4.5198	98.8980
8940	4.5516	98.9983	4.5569	99.0151	4.5621	99.0318	4.5674	99.0485	4.5727	99.0652
8950	4.6044	99.1655	4.6097	99.1822	4.6150	99.1989	4.6203	99.2156	4.6256	99.2324
8960	4.6573	99.3326	4.6626	99.3493	4.6678	99.3660	4.6731	99.3827	4.6784	99.3994
8970	4.7101	99.4996	4.7154	99.5163	4.7206	99.5330	4.7259	99.5497	4.7312	99.5664
8980	4.7629	99.6665	4.7681	99.6832	4.7734	99.6999	4.7787	99.7165	4.7840	99.7332
8990	4.8156	99.8333	4.8209	99.8500	4.8262	99.8666	4.8314	99.8833	4.8367	99.9000
9000	4.8683	*0.0000	4.8736	*0.0167	4.8789	*0.0333	4.8841	*0.0500	4.8894	*0.0667
9010	4.9210	0.1666	4.9263	0.1833	4.9316	0.1999	4.9368	0.2166	4.9421	0.2332
9020	4.9737	0.3331	4.9789	0.3498	4.9842	0.3664	4.9895	0.3831	4.9947	0.3997
9030	5.0263	0.4996	5.0316	0.5162	5.0368	0.5329	5.0421	0.5495	5.0474	0.5661
9040	5.0789	0.6659	5.0842	0.6826	5.0894	0.6992	5.0947	0.7158	5.0999	0.7324
9050	5.1315	0.8322	5.1367	0.8488	5.1420	0.8654	5.1473	0.8820	5.1525	0.8987
9060	5.1840	0.9983	5.1893	1.0150	5.1945	1.0316	5.1998	1.0482	5.2050	1.0648
9070	5.2365	1.1644	5.2418	1.1810	5.2470	1.1976	5.2523	1.2142	5.2575	1.2308
9080	5.2890	1.3304	5.2943	1.3470	5.2995	1.3636	5.3048	1.3802	5.3100	1.3967
9090	5.3415	1.4963	5.3467	1.5129	5.3520	1.5294	5.3572	1.5460	5.3625	1.5626
	90+	300+	90+	300+	90+	300+	90+	300+	90+	300+

SQUARE ROOTS

5		6		7		8		9		N
√N	√10N	√N	√10N	√N	√10N	√N	√10N	√N	√10N	
90+	200+	90+	200+	90+	200+	90+	200+	90+	200+	
3.0323	94.1938	3.0376	94.2108	3.0430	94.2278	3.0484	94.2448	3.0537	94.2618	8650
3.0860	94.3637	3.0914	94.3807	3.0967	94.3977	3.1021	94.4147	3.1075	94.4317	8660
3.1397	94.5335	3.1450	94.5505	3.1504	94.5675	3.1558	94.5845	3.1612	94.6014	8670
3.1933	94.7032	3.1987	94.7202	3.2041	94.7372	3.2094	94.7541	3.2148	94.7711	8680
3.2470	94.8729	3.2523	94.8898	3.2577	94.9068	3.2631	94.9237	3.2684	94.9407	8690
3.3006	95.0424	3.3059	95.0593	3.3113	95.0763	3.3167	95.0932	3.3220	95.1101	8700
3.3542	95.2118	3.3595	95.2287	3.3649	95.2457	3.3702	95.2626	3.3756	95.2795	8710
3.4077	95.3811	3.4131	95.3980	3.4184	95.4150	3.4238	95.4319	3.4291	95.4488	8720
3.4612	95.5503	3.4666	95.5673	3.4719	95.5842	3.4773	95.6011	3.4826	95.6180	8730
3.5147	95.7195	3.5201	95.7364	3.5254	95.7533	3.5307	95.7702	3.5361	95.7871	8740
3.5682	95.8885	3.5735	95.9054	3.5788	95.9223	3.5842	95.9392	3.5895	95.9561	8750
3.6216	96.0574	3.6269	96.0743	3.6323	96.0912	3.6376	96.1081	3.6429	96.1250	8760
3.6750	96.2263	3.6803	96.2431	3.6856	96.2600	3.6910	96.2769	3.6963	96.2938	8770
3.7283	96.3950	3.7337	96.4119	3.7390	96.4287	3.7443	96.4456	3.7497	96.4625	8780
3.7817	96.5637	3.7870	96.5805	3.7923	96.5974	3.7977	96.6142	3.8030	96.6311	8790
3.8350	96.7322	3.8403	96.7491	3.8456	96.7659	3.8509	96.7827	3.8563	96.7996	8800
3.8882	96.9007	3.8936	96.9175	3.8989	96.9343	3.9042	96.9512	3.9095	96.9680	8810
3.9415	97.0690	3.9468	97.0858	3.9521	97.1027	3.9574	97.1195	3.9628	97.1363	8820
3.9947	97.2373	4.0000	97.2541	4.0053	97.2709	4.0106	97.2877	4.0160	97.3046	8830
4.0479	97.4054	4.0532	97.4223	4.0585	97.4391	4.0638	97.4559	4.0691	97.4727	8840
4.1010	97.5735	4.1063	97.5903	4.1116	97.6071	4.1169	97.6239	4.1223	97.6407	8850
4.1541	97.7415	4.1594	97.7583	4.1647	97.7751	4.1701	97.7919	4.1754	97.8087	8860
4.2072	97.9094	4.2125	97.9262	4.2178	97.9429	4.2231	97.9597	4.2284	97.9765	8870
4.2603	98.0772	4.2656	98.0939	4.2709	98.1107	4.2762	98.1275	4.2815	98.1443	8880
4.3133	98.2449	4.3186	98.2616	4.3239	98.2784	4.3292	98.2952	4.3345	98.3119	8890
4.3663	98.4125	4.3716	98.4292	4.3769	98.4460	4.3822	98.4627	4.3875	98.4795	8900
4.4193	98.5800	4.4246	98.5967	4.4299	98.6135	4.4352	98.6302	4.4405	98.6469	8910
4.4722	98.7474	4.4775	98.7641	4.4828	98.7809	4.4881	98.7976	4.4934	98.8143	8920
4.5251	98.9147	4.5304	98.9314	4.5357	98.9482	4.5410	98.9649	4.5463	98.9816	8930
4.5780	99.0819	4.5833	99.0986	4.5886	99.1154	4.5939	99.1321	4.5992	99.1488	8940
4.6309	99.2491	4.6361	99.2558	4.6414	99.2825	4.6467	99.2992	4.6520	99.3159	8950
4.6837	99.4161	4.6890	99.4328	4.6942	99.4495	4.6995	99.4662	4.7048	99.4829	8960
4.7365	99.5830	4.7418	99.5997	4.7470	99.6164	4.7523	99.6331	4.7576	99.6498	8970
4.7892	99.7499	4.7945	99.7666	4.7998	99.7833	4.8051	99.7999	4.8103	99.8166	8980
4.8420	99.9167	4.8472	99.9333	4.8525	99.9500	4.8578	99.9667	4.8631	99.9833	8990
4.8947	*0.0833	4.8999	*0.1000	4.9052	*0.1166	4.9105	*0.1333	4.9158	*0.1500	9000
4.9474	0.2499	4.9526	0.2665	4.9579	0.2832	4.9632	0.2999	4.9684	0.3165	9010
5.0000	0.4164	5.0053	0.4330	5.0105	0.4497	5.0158	0.4663	5.0211	0.4829	9020
5.0526	0.5828	5.0579	0.5994	5.0631	0.6160	5.0684	0.6327	5.0737	0.6493	9030
5.1052	0.7491	5.1105	0.7657	5.1157	0.7823	5.1210	0.7989	5.1262	0.8156	9040
5.1578	0.9153	5.1630	0.9319	5.1683	0.9485	5.1735	0.9651	5.1788	0.9817	9050
5.2103	1.0814	5.2155	1.0980	5.2208	1.1146	5.2260	1.1312	5.2313	1.1478	9060
5.2628	1.2474	5.2680	1.2640	5.2733	1.2806	5.2785	1.2972	5.2838	1.3138	9070
5.3153	1.4133	5.3205	1.4299	5.3258	1.4465	5.3310	1.4631	5.3362	1.4797	9080
5.3677	1.5792	5.3730	1.5958	5.3782	1.6123	5.3834	1.6289	5.3887	1.6455	9090
90+	300+	90+	300+	90+	300+	90+	300+	90+	300+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	90+	300+	90+	300+	90+	300+	90+	300+	90+	300+
9100	5.3939	1.6621	5.3992	1.6786	5.4044	1.6952	5.4096	1.7118	5.4149	1.7284
9110	5.4463	1.8278	5.4516	1.8443	5.4568	1.8609	5.4620	1.8775	5.4673	1.8940
9120	5.4987	1.9934	5.5039	2.0099	5.5092	2.0265	5.5144	2.0430	5.5196	2.0596
9130	5.5510	2.1589	5.5563	2.1754	5.5615	2.1920	5.5667	2.2085	5.5720	2.2251
9140	5.6033	2.3243	5.6086	2.3409	5.6138	2.3574	5.6190	2.3739	5.6243	2.3905
9150	5.6556	2.4897	5.6609	2.5062	5.6661	2.5227	5.6713	2,5393	5.6765	2.5558
9160	5.7079	2.6549	5.7131	2.6714	5.7183	2.6880	5.7236	2.7045	5.7288	2.7210
9170	5.7601	2.8201	5.7653	2.8366	5.7706	2.8531	5.7758	2.8696	5.7810	2.8861
9180	5.8123	2.9851	5.8175	3.0017	5.8228	3.0182	5.8280	3.0347	5.8332	3.0512
9190	5.8645	3.1501	5.8697	3.1666	5.8749	3.1831	5.8801	3.1996	5.8853	3.2161
9200	5.9166	3.3150	5.9218	3.3315	5.9271	3.3480	5.9323	3.3645	5.9375	3.3809
9210	5.9687	3.4798	5.9740	3.4963	5.9792	3.5128	5.9844	3.5292	5.9896	3.5457
9220	6.0208	3.6445	6.0260	3.6610	6.0312	3.6775	6.0365	3.6939	6.0417	3.7104
9230	6.0729	3.8092	6.0781	3.8256	6.0833	3.8421	6.0885	3.8585	6.0937	3.8750
9240	6.1249	3.9737	6.1301	3.9901	6.1353	4.0066	6.1405	4.0230	6.1457	4.0395
9250	6.1769	4.1381	6.1821	4.1546	6.1873	4.1710	6.1925	4.1874	6.1977	4.2039
9260	6.2289	4.3025	6.2341	4.3189	6.2393	4.3353	6.2445	4.3518	6.2497	4.3682
9270	6.2808	4.4667	6.2860	4.4832	6.2912	4.4996	6.2964	4.5160	6.3016	4.5324
9280	6.3328	4.6309	6.3379	4.6473	6.3431	4.6637	6.3483	4.6802	6.3535	4.6966
9290	6.3846	4.7950	6.3898	4.8114	6.3950	4.8278	6.4002	4.8442	6.4054	4.8606
9300	6.4365	4.9590	6.4417	4.9754	6.4469	4.9918	6.4521	5.0082	6.4572	5.0246
9310	6.4883	5.1229	6.4935	5.1393	6.4987	5.1557	6.5039	5.1721	6.5091	5.1885
9320	6.5401	5.2868	6.5453	5.3031	6.5505	5.3195	6.5557	5.3359	6.5609	5.3523
9330	6.5919	5.4505	6.5971	5.4669	6.6023	5.4832	6.6075	5.4996	6.6126	5.5160
9340	6.6437	5.6141	6.6488	5.6305	6.6540	5.6469	6.6592	5.6632	6.6644	5.6796
9350	6.6954	5.7777	6.7006	5.7940	6.7057	5.8104	6.7109	5.8267	6.7161	5.8431
9360	6.7471	5.9412	6.7523	5.9575	6.7574	5.9739	6.7626	5.9902	6.7678	6.0065
9370	6.7988	6.1046	6.8039	6.1209	6.8091	6.1372	6.8143	6.1536	6.8194	6.1699
9380	6.8504	6.2679	6.8556	6.2842	6.8607	6.3005	6.8659	6.3168	6.8710	6.3332
9390	6.9020	6.4311	6.9072	6.4474	6.9123	6.4637	6.9175	6.4800	6.9227	6.4963
9400	6.9536	6.5942	6.9588	6.6105	6.9639	6.6268	6.9691	6.6431	6.9742	6.6594
9410	7.0052	6.7572	7.0103	6.7735	7.0155	6.7898	7.0206	6.8061	7.0258	6.8224
9420	7.0567	6.9202	7.0618	6.9365	7.0670	6.9528	7.0721	6.9691	7.0773	6.9853
9430	7.1082	7.0831	7.1133	7.0993	7.1185	7.1156	7.1236	7.1319	7.1288	7.1482
9440	7.1597	7.2458	7.1648	7.2621	7.1700	7.2784	7.1751	7.2946	7.1802	7.3109
9450	7.2111	7.4085	7.2163	7.4248	7.2214	7.4411	7.2265	7.4573	7.2317	7.4736
9460	7.2625	7.5711	7.2677	7.5874	7.2728	7.6036	7.2780	7.6199	7.2831	7.6361
9470	7.3139	7.7337	7.3191	7.7499	7.3242	7.7661	7.3293	7.7824	7.3345	7.7986
9480	7.3653	7.8961	7.3704	7.9123	7.3756	7.9286	7.3807	7.9448	7.3858	7.9610
9490	7.4166	8.0584	7.4218	8.0747	7.4269	8.0909	7.4320	8.1071	7.4372	8.1234
9500	7.4679	8.2207	7.4731	8.2369	7.4782	8.2531	7.4833	8.2694	7.4885	8.2856
9510	7.5192	8.3829	7.5244	8.3991	7.5295	8.4153	7.5346	8.4315	7.5397	8.4477
9520	7.5705	8.5450	7.5756	8.5612	7.5807	8.5774	7.5859	8.5936	7.5910	8.6098
9530	7.6217	8.7070	7.6268	8.7232	7.6320	8.7394	7.6371	8.7556	7.6422	8.7718
9540	7.6729	8.8689	7.6780	8.8851	7.6832	8.9013	7.6883	8.9175	7.6934	8.9337
	90+	300+	90+	300+	90+	300+	90+	300+	90+	300+

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
90+	300+	90+	300+	90+	300+	90+	300+	90+	300+	
5.4201	1.7449	5.4254	1.7615	5.4306	1.7781	5.4358	1.7946	5.4411	1.8112	9100
5.4725	1.9106	5.4777	1.9271	5.4830	1.9437	5.4882	1.9603	5.4935	1.9768	9110
5.5249	2.0761	5.5301	2.0927	5.5353	2.1093	5.5406	2.1258	5.5458	2.1424	9120
5.5772	2.2416	5.5824	2.2582	5.5877	2.2747	5.5929	2.2913	5.5981	2.3078	9130
5.6295	2.4070	5.6347	2.4235	5.6400	2.4401	5.6452	2.4566	5.6504	2.4731	9140
5.6818	2.5723	5.6870	2.5888	5.6922	2.6054	5.6974	2.6219	5.7027	2.6384	9150
5.7340	2.7375	5.7392	2.7540	5.7445	2.7705	5.7497	2.7871	5.7549	2.8036	9160
5.7862	2.9026	5.7914	2.9191	5.7967	2.9356	5.8019	2.9521	5.8071	2.9686	9170
5.8384	3.0676	5.8436	3.0841	5.8488	3.1006	5.8541	3.1171	5.8593	3.1336	9180
5.8906	3.2326	5.8958	3.2491	5.9010	3.2656	5.9062	3.2820	5.9114	3.2985	9190
5.9427	3.3974	5.9479	3.4139	5.9531	3.4304	5.9583	3.4469	5.9635	3.4633	9200
5.9948	3.5622	6.0000	3.5787	6.0052	3.5951	6.0104	3.6116	6.0156	3.6281	9210
6.0469	3.7269	6.0521	3.7433	6.0573	3.7598	6.0625	3.7762	6.0677	3.7927	9220
6.0989	3.8914	6.1041	3.9079	6.1093	3.9243	6.1145	3.9408	6.1197	3.9572	9230
6.1509	4.0559	6.1561	4.0724	6.1613	4.0888	6.1665	4.1052	6.1717	4.1217	9240
6.2029	4.2203	6.2081	4.2368	6.2133	4.2532	6.2185	4.2696	6.2237	4.2861	9250
6.2549	4.3846	6.2601	4.4011	6.2653	4.4175	6.2705	4.4339	6.2756	4.4503	9260
6.3068	4.5488	6.3120	4.5653	6.3172	4.5817	6.3224	4.5981	6.3276	4.6145	9270
6.3587	4.7130	6.3639	4.7294	6.3691	4.7458	6.3743	4.7622	6.3795	4.7786	9280
6.4106	4.8770	6.4158	4.8934	6.4210	4.9098	6.4261	4.9262	6.4313	4.9426	9290
6.4624	5.0410	6.4676	5.0574	6.4728	5.0738	6.4780	5.0902	6.4832	5.1065	9300
6.5142	5.2048	6.5194	5.2212	6.5246	5.2376	6.5298	5.2540	6.5350	5.2704	9310
6.5660	5.3686	6.5712	5.3850	6.5764	5.4014	6.5816	5.4177	6.5867	5.4341	9320
6.6178	5.5323	6.6230	5.5487	6.6282	5.5651	6.6333	5.5814	6.6385	5.5978	9330
6.6695	5.6959	6.6747	5.7123	6.6799	5.7286	6.6851	5.7450	6.6902	5.7613	9340
6.7212	5.8594	6.7264	5.8758	6.7316	5.8921	6.7368	5.9085	6.7419	5.9248	9350
6.7729	6.0229	6.7781	6.0392	6.7833	6.0556	6.7884	6.0719	6.7936	6.0882	9360
6.8246	6.1862	6.8297	6.2025	6.8349	6.2189	6.8401	6.2352	6.8452	6.2515	9370
6.8762	6.3495	6.8814	6.3658	6.8865	6.3821	6.8917	6.3984	6.8969	6.4148	9380
6.9278	6.5126	6.9330	6.5290	6.9381	6.5453	6.9433	6.5616	6.9484	6.5779	9390
6.9794	6.6757	6.9845	6.6920	6.9897	6.7083	6.9948	6.7246	7.0000	6.7409	9400
7.0309	6.8387	7.0361	6.8550	7.0412	6.8713	7.0464	6.8876	7.0515	6.9039	9410
7.0824	7.0016	7.0876	7.0179	7.0927	7.0342	7.0979	7.0505	7.1030	7.0668	9420
7.1339	7.1645	7.1391	7.1807	7.1442	7.1970	7.1494	7.2133	7.1545	7.2296	9430
7.1854	7.3272	7.1905	7.3435	7.1957	7.3597	7.2008	7.3760	7.2060	7.3923	9440
7.2368	7.4898	7.2420	7.5061	7.2471	7.5224	7.2522	7.5386	7.2574	7.5549	9450
7.2882	7.6524	7.2934	7.6687	7.2985	7.6849	7.3036	7.7012	7.3088	7.7174	9460
7.3396	7.8149	7.3447	7.8311	7.3499	7.8474	7.3550	7.8636	7.3602	7.8798	9470
7.3910	7.9773	7.3961	7.9935	7.4012	8.0097	7.4064	8.0260	7.4115	8.0422	9480
7.4423	8.1396	7.4474	8.1558	7.4526	8.1720	7.4577	8.1883	7.4628	8.2045	9490
7.4936	8.3018	7.4987	8.3180	7.5038	8.3342	7.5090	8.3505	7.5141	8.3667	9500
7.5449	8.4639	7.5500	8.4801	7.5551	8.4964	7.5602	8.5126	7.5654	8.5288	9510
7.5961	8.6260	7.6012	8.6422	7.6064	8.6584	7.6115	8.6746	7.6166	8.6908	9520
7.6473	8.7880	7.6524	8.8041	7.6576	8.8203	7.6627	8.8365	7.6678	8.8527	9530
7.6985	8.9498	7.7036	8.9660	7.7088	8.9822	7.7139	8.9984	7.7190	9.0146	9540
90+	300+	90+	300+	90+	300+	90+	300+	90+	300+	

SQUARE ROOTS

N	0		1		2		3		4	
	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$
	90+	300+	90+	300+	90+	300+	90+	300+	90+	300+
9550	7.7241	9.0307	7.7292	9.0469	7.7343	9.0631	7.7395	9.0793	7.7446	9.0955
9560	7.7753	9.1925	7.7804	9.2087	7.7855	9.2248	7.7906	9.2410	7.7957	9.2572
9570	7.8264	9.3542	7.8315	9.3703	7.8366	9.3865	7.8417	9.4027	7.8468	9.4188
9580	7.8775	9.5158	7.8826	9.5319	7.8877	9.5481	7.8928	9.5642	7.8979	9.5804
9590	7.9285	9.6773	7.9337	9.6934	7.9388	9.7095	7.9439	9.7257	7.9490	9.7418
9600	7.9796	9.8387	7.9847	9.8548	7.9898	9.8709	7.9949	9.8871	8.0000	9.9032
9610	8.0306	10.0000	8.0357	10.0161	8.0408	10.0323	8.0459	10.0484	8.0510	10.0645
9620	8.0816	10.1612	8.0867	10.1774	8.0918	10.1935	8.0969	10.2096	8.1020	10.2257
9630	8.1326	10.3224	8.1377	10.3385	8.1428	10.3546	8.1478	10.3707	8.1529	10.3869
9640	8.1835	10.4835	8.1886	10.4996	8.1937	10.5157	8.1988	10.5318	8.2039	10.5479
9650	8.2344	10.6445	8.2395	10.6606	8.2446	10.6767	8.2497	10.6928	8.2548	10.7089
9660	8.2853	10.8054	8.2904	10.8215	8.2955	10.8376	8.3006	10.8537	8.3056	10.8697
9670	8.3362	10.9662	8.3412	10.9823	8.3463	10.9984	8.3514	11.0145	8.3565	11.0305
9680	8.3870	11.1270	8.3921	11.1431	8.3972	11.1591	8.4022	11.1752	8.4073	11.1913
9690	8.4378	11.2876	8.4429	11.3037	8.4480	11.3198	8.4530	11.3358	8.4581	11.3519
9700	8.4886	11.4482	8.4937	11.4643	8.4987	11.4803	8.5038	11.4964	8.5089	11.5124
9710	8.5393	11.6087	8.5444	11.6248	8.5495	11.6408	8.5546	11.6569	8.5596	11.6729
9720	8.5901	11.7691	8.5951	11.7852	8.6002	11.8012	8.6053	11.8173	8.6103	11.8333
9730	8.6408	11.9296	8.6458	11.9455	8.6509	11.9615	8.6560	11.9776	8.6610	11.9936
9740	8.6914	12.0897	8.6965	12.1058	8.7016	12.1218	8.7066	12.1378	8.7117	12.1538
9750	8.7421	12.2499	8.7472	12.2659	8.7522	12.2819	8.7573	12.2979	8.7623	12.3139
9760	8.7927	12.4100	8.7978	12.4260	8.8028	12.4420	8.8079	12.4580	8.8130	12.4740
9770	8.8433	12.5700	8.8484	12.5860	8.8534	12.6020	8.8585	12.6180	8.8635	12.6340
9780	8.8939	12.7299	8.8989	12.7459	8.9040	12.7619	8.9090	12.7779	8.9141	12.7939
9790	8.9444	12.8898	8.9495	12.9057	8.9545	12.9217	8.9596	12.9377	8.9646	12.9537
9800	8.9949	13.0495	9.0000	13.0655	9.0051	13.0815	9.0101	13.0974	9.0152	13.1134
9810	9.0454	13.2092	9.0505	13.2252	9.0555	13.2411	9.0606	13.2571	9.0656	13.2730
9820	9.0959	13.3688	9.1010	13.3847	9.1060	13.4007	9.1110	13.4167	9.1161	13.4326
9830	9.1464	13.5283	9.1514	13.5443	9.1564	13.5602	9.1615	13.5761	9.1665	13.5921
9840	9.1968	13.6877	9.2018	13.7037	9.2069	13.7196	9.2119	13.7356	9.2169	13.7515
9850	9.2472	13.8471	9.2522	13.8630	9.2572	13.8790	9.2623	13.8949	9.2673	13.9108
9860	9.2975	14.0064	9.3026	14.0223	9.3076	14.0382	9.3126	14.0541	9.3177	14.0701
9870	9.3479	14.1656	9.3529	14.1815	9.3579	14.1974	9.3630	14.2133	9.3680	14.2292
9880	9.3982	14.3247	9.4032	14.3406	9.4082	14.3565	9.4133	14.3724	9.4183	14.3883
9890	9.4486	14.4837	9.4535	14.4996	9.4585	14.5155	9.4636	14.5314	9.4686	14.5473
9900	9.4987	14.6427	9.5038	14.6585	9.5088	14.6744	9.5138	14.6903	9.5188	14.7062
9910	9.5490	14.8015	9.5540	14.8174	9.5590	14.8333	9.5641	14.8492	9.5691	14.8651
9920	9.5992	14.9603	9.6042	14.9762	9.6092	14.9921	9.6143	15.0079	9.6193	15.0238
9930	9.6494	15.1190	9.6544	15.1349	9.6594	15.1508	9.6644	15.1666	9.6695	15.1825
9940	9.6995	15.2777	9.7046	15.2935	9.7096	15.3094	9.7146	15.3252	9.7196	15.3411
9950	9.7497	15.4362	9.7547	15.4521	9.7597	15.4679	9.7647	15.4838	9.7697	15.4996
9960	9.7998	15.5947	9.8048	15.6105	9.8098	15.6264	9.8148	15.6422	9.8198	15.6580
9970	9.8499	15.7531	9.8549	15.7689	9.8599	15.7847	9.8649	15.8006	9.8699	15.8164
9980	9.9000	15.9114	9.9050	15.9272	9.9100	15.9430	9.9150	15.9589	9.9200	15.9747
9990	9.9500	16.0696	9.9550	16.0854	9.9600	16.1013	9.9650	16.1171	9.9700	16.1329
	90+	300+	90+	300+	90+	300+	90+	300+	90+	300+

SQUARE ROOTS

5		6		7		8		9		N
$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	$\sqrt{N}$	$\sqrt{10N}$	
90+	300+	90+	300+	90+	300+	90+	300+	90+	300+	
7.7497	9.1116	7.7548	9.1278	7.7599	9.1440	7.7650	9.1602	7.7701	9.1763	9550
7.8008	9.2733	7.8059	9.2895	7.8110	9.3057	7.8162	9.3218	7.8213	9.3380	9560
7.8519	9.4350	7.8570	9.4511	7.8621	9.4673	7.8673	9.4834	7.8724	9.4996	9570
7.9030	9.5965	7.9081	9.6127	7.9132	9.6288	7.9183	9.6450	7.9234	9.6611	9580
7.9541	9.7580	7.9592	9.7741	7.9643	9.7903	7.9694	9.8064	7.9745	9.8225	9590
8.0051	9.9193	8.0102	9.9355	8.0153	9.9516	8.0204	9.9677	8.0255	9.9839	9600
8.0561	10.0806	8.0612	10.0968	8.0663	10.1129	8.0714	10.1290	8.0765	10.1451	9610
6.1071	10.2418	8.1122	10.2580	8.1173	10.2741	8.1224	10.2902	8.1275	10.3063	9620
8.1580	10.4030	8.1631	10.4191	8.1682	10.4352	8.1733	10.4513	8.1784	10.4674	9630
8.2090	10.5640	8.2141	10.5801	8.2191	10.5962	8.2242	10.6123	8.2293	10.6284	9640
8.2599	10.7250	8.2649	10.7411	8.2700	10.7571	8.2751	10.7732	8.2802	10.7893	9650
8.3107	10.8858	8.3158	10.9019	8.3209	10.9180	8.3260	10.9341	8.3311	10.9502	9660
8.3616	11.0466	8.3667	11.0627	8.3717	11.0788	8.3768	11.0948	8.3819	11.1109	9670
8.4124	11.2073	8.4175	11.2234	8.4226	11.2395	8.4276	11.2555	8.4327	11.2716	9680
8.4632	11.3680	8.4683	11.3840	8.4733	11.4001	8.4784	11.4161	8.4835	11.4322	9690
8.5140	11.5285	8.5190	11.5445	8.5241	11.5606	8.5292	11.5766	8.5343	11.5927	9700
8.5647	11.6889	8.5698	11.7050	8.5748	11.7210	8.5799	11.7371	8.5850	11.7531	9710
8.6154	11.8493	8.6205	11.8654	8.6256	11.8814	8.6306	11.8974	8.6357	11.9135	9720
8.6661	12.0096	8.6712	12.0256	8.6762	12.0417	8.6813	12.0577	8.6864	12.0737	9730
8.7168	12.1698	8.7218	12.1858	8.7269	12.2019	8.7320	12.2179	8.7370	12.2339	9740
8.7674	12.3300	8.7725	12.3460	8.7775	12.3620	8.7826	12.3780	8.7877	12.3940	9750
8.8180	12.4900	8.8231	12.5060	8.8281	12.5220	8.8332	12.5380	8.8383	12.5540	9760
8.8686	12.6500	8.8737	12.6660	8.8787	12.6819	8.8838	12.6979	8.8888	12.7139	9770
8.9192	12.8098	8.9242	12.8258	8.9293	12.8418	8.9343	12.8578	8.9394	12.8738	9780
8.9697	12.9696	8.9747	12.9856	8.9798	13.0016	8.9848	13.0176	8.9899	13.0335	9790
9.0202	13.1294	9.0252	13.1453	9.0303	13.1613	9.0353	13.1773	9.0404	13.1932	9800
9.0707	13.2890	9.0757	13.3050	9.0808	13.3209	9.0858	13.3369	9.0909	13.3528	9810
9.1211	13.4486	9.1262	13.4645	9.1312	13.4805	9.1363	13.4964	9.1413	13.5124	9820
9.1716	13.6080	9.1766	13.6240	9.1817	13.6399	9.1867	13.6559	9.1917	13.6718	9830
9.2220	13.7674	9.2270	13.7834	9.2321	13.7993	9.2371	13.8152	9.2421	13.8312	9840
9.2724	13.9267	9.2774	13.9427	9.2824	13.9586	9.2875	13.9745	9.2925	13.9904	9850
9.3227	14.0860	9.3277	14.1019	9.3328	14.1178	9.3378	14.1337	9.3428	13.1496	9860
9.3730	14.2451	9.3781	14.2610	9.3831	14.2769	9.3881	14.2929	9.3932	14.3088	9870
9.4233	14.4042	9.4284	14.4201	9.4334	14.4360	9.4384	14.4519	9.4435	14.4678	9880
9.4736	14.5632	9.4786	14.5791	9.4837	14.5950	9.4887	14.6109	9.4937	14.6268	9890
9.5239	14.7221	9.5289	14.7380	9.5339	14.7539	9.5389	14.7698	9.5440	14.7856	9900
9.5741	14.8809	9.5791	14.8968	9.5841	14.9127	9.5892	14.9286	9.5942	14.9444	9910
9.6243	15.0397	9.6293	15.0556	9.6343	15.0714	9.6394	15.0873	9.6444	15.1032	9920
9.6745	15.1984	9.6795	15.2142	9.6845	15.2301	9.6895	15.2459	9.6945	15.2618	9930
9.7246	15.3569	9.7296	15.3728	9.7346	15.3886	9.7397	15.4045	9.7447	15.4204	9940
9.7747	15.5155	9.7798	15.5313	9.7848	15.5471	9.7898	15.5630	9.7948	15.5788	9950
9.8248	15.6739	9.8299	15.6897	9.8349	15.7056	9.8399	15.7214	9.8449	15.7372	9960
9.8749	15.8322	9.8799	15.8481	9.8849	15.8639	9.8899	15.8797	9.8949	15.8956	9970
9.9250	15.9905	9.9300	16.0063	9.9350	16.0222	9.9400	16.0380	9.9450	16.0538	9980
9.9750	16.1487	9.9800	16.1645	9.9850	16.1803	9.9900	16.1961	9.9950	16.2120	9990
90+	300+	90+	300+	90+	300+	90+	300+	90+	300+	

TABLE 3. TABLE OF CUBES AND CUBE ROOTS, 1–1,000 INCLUDING N, $10N$, AND $100N$

n	n^3	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
1	1	1.000 000	2.154 435	4.641 589
2	8	1.259 921	2.714 418	5.848 035
3	27	1.442 250	3.107 233	6.694 330
4	64	1.587 401	3.419 952	7.368 063
5	125	1.709 976	3.684 031	7.937 005
6	216	1.817 121	3.914 868	8.434 327
7	343	1.912 931	4.121 285	8.879 040
8	512	2.000 000	4.308 869	9.283 178
9	729	2.080 084	4.481 405	9.654 894
10	1 000	2.154 435	4.641 589	10.00000
11	1 331	2.223 980	4.791 420	10.32280
12	1 728	2.289 428	4.932 424	10.62659
13	2 197	2.351 335	5.065 797	10.91393
14	2 744	2.410 142	5.192 494	11.18689
15	3 375	2.466 212	5.313 293	11.44714
16	4 096	2.519 842	5.428 835	11.69607
17	4 913	2.571 282	5.539 658	11.93483
18	5 832	2.620 741	5.646 216	12.16440
19	6 859	2.668 402	5.748 897	12.38562
20	8 000	2.714 418	5.848 035	12.59921
21	9 261	2.758 924	5.943 922	12.80579
22	10 648	2.802 039	6.036 811	13.00591
23	12 167	2.843 867	6.126 926	13.20006
24	13 824	2.884 499	6.214 465	13.38866
25	15 625	2.924 018	6.299 605	13.57209
26	17 576	2.962 496	6.382 504	13.75069
27	19 683	3.000 000	6.463 304	13.92477
28	21 952	3.036 589	6.542 133	14.09460
29	24 389	3.072 317	6.619 106	14.26043
30	27 000	3.107 233	6.694 330	14.42250
31	29 791	3.141 381	6.767 899	14.58100
32	32 768	3.174 802	6.839 904	14.73613
33	35 937	3.207 534	6.910 423	14.88806
34	39 304	3.239 612	6.979 532	15.03695
35	42 875	3.271 066	7.047 299	15.18294
36	46 656	3.301 927	7.113 787	15.32619
37	50 653	3.332 222	7.179 054	15.46680
38	54 872	3.361 975	7.243 156	15.60491
39	59 319	3.391 211	7.306 144	15.74061
40	64 000	3.419 952	7.368 063	15.87401
41	68 921	3.448 217	7.428 959	16.00521
42	74 088	3.476 027	7.488 872	16.13429
43	79 507	3.503 398	7.547 842	16.26133
44	85 184	3.530 348	7.605 905	16.38643
45	91 125	3.556 893	7.663 094	16.50964
46	97 336	3.583 048	7.719 443	16.63103
47	103 823	3.608 826	7.774 980	16.75069
48	110 592	3.634 241	7.829 735	16.86865
49	117 649	3.659 306	7.883 735	16.98499
50	125 000	3.684 031	7.937 005	17.09976
50	125 000	3.684 031	7.937 005	17.09976
51	132 651	3.708 430	7.989 570	17.21301
52	140 608	3.732 511	8.041 452	17.32478
53	148 877	3.756 286	8.092 672	17.43513
54	157 464	3.779 763	8.143 253	17.54411
55	166 375	3.802 952	8.193 213	17.65174
56	175 616	3.825 862	8.242 571	17.75808
57	185 193	3.848 501	8.291 344	17.86316
58	195 112	3.870 877	8.339 551	17.96702
59	205 379	3.892 996	8.387 207	18.06969
60	216 000	3.914 868	8.434 327	18.17121
61	226 981	3.936 497	8.480 926	18.27160
62	238 328	3.957 892	8.527 019	18.37091
63	250 047	3.979 057	8.572 619	18.46915
64	262 144	4.000 000	8.617 739	18.56636
65	274 625	4.020 726	8.662 391	18.66256
66	287 496	4.041 240	8.706 588	18.75777
67	300 763	4.061 548	8.750 340	18.85204
68	314 432	4.081 655	8.793 659	18.94536
69	328 509	4.101 566	8.836 556	19.03778
70	343 000	4.121 285	8.879 040	19.12931
71	357 911	4.140 818	8.921 121	19.21997
72	373 248	4.160 168	8.962 809	19.30979
73	389 017	4.179 339	9.004 113	19.39877
74	405 224	4.198 336	9.045 042	19.48695
75	421 875	4.217 163	9.085 603	19.57434
76	438 976	4.235 824	9.125 805	19.66095
77	456 533	4.254 321	9.165 656	19.74681
78	474 552	4.272 659	9.205 164	19.83192
79	493 039	4.290 840	9.244 335	19.91632
80	512 000	4.308 869	9.283 178	20.00000
81	531 441	4.326 749	9.321 698	20.08299
82	551 368	4.344 481	9.359 902	20.16530
83	571 787	4.362 071	9.397 796	20.24694
84	592 704	4.379 519	9.435 388	20.32793
85	614 125	4.396 830	9.472 682	20.40828
86	636 056	4.414 005	9.509 685	20.48800
87	658 503	4.431 048	9.546 403	20.56710
88	681 472	4.447 960	9.582 840	20.64560
89	704 969	4.464 745	9.619 002	20.72351
90	729 000	4.481 405	9.654 894	20.80084
91	753 571	4.497 941	9.690 521	20.87759
92	778 688	4.514 357	9.725 888	20.95379
93	804 357	4.530 655	9.761 000	21.02944
94	830 584	4.546 836	9.795 861	21.10454
95	857 375	4.562 903	9.830 476	21.17912
96	884 736	4.578 857	9.864 848	21.25317
97	912 673	4.594 701	9.898 983	21.32671
98	941 192	4.610 436	9.932 884	21.30975
99	970 299	4.626 065	9.966 555	21.47229
100	1 000 000	4.641 589	10.00000	21.54435

Source: Reproduced in extract form from C. D. Hodgman, *Mathematical Tables* (7th ed.: Cleveland, Ohio: Chemical Rubber Publishing Co., 1941), pp. 176–193.

CUBES AND CUBE ROOTS

n	n^3	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
100	1 000 000	4.641 589	10.00000	21.54435
101	1 030 301	4.657 010	10.03322	21.61592
102	1 061 208	4.672 329	10.06623	21.68703
103	1 092 727	4.687 548	10.09902	21.75767
104	1 124 864	4.702 669	10.13159	21.82786
105	1 157 625	4.717 694	10.16396	21.89760
106	1 191 016	4.732 623	10.19613	21.96689
107	1 225 043	4.747 459	10.22809	22.03575
108	1 259 712	4.762 203	10.25986	22.10419
109	1 295 029	4.776 856	10.29142	22.17220
110	1 331 000	4.791 420	10.32280	22.23980
111	1 367 631	4.805 896	10.35399	22.30699
112	1 404 928	4.820 285	10.38499	22.37378
113	1 442 897	4.834 588	10.41580	22.44017
114	1 481 544	4.848 808	10.44644	22.50617
115	1 520 875	4.862 944	10.47690	22.57179
116	1 560 896	4.876 999	10.50718	22.63702
117	1 601 613	4.890 973	10.53728	22.70189
118	1 643 032	4.904 868	10.56722	22.76638
119	1 685 159	4.918 685	10.59699	22.83051
120	1 728 000	4.932 424	10.62659	22.89428
121	1 771 561	4.946 087	10.65602	22.95770
122	1 815 848	4.959 676	10.68530	23.02078
123	1 860 867	4.973 190	10.71441	23.08350
124	1 906 624	4.986 631	10.74337	23.14589
125	1 953 125	5.000 000	10.77217	23.20794
126	2 000 376	5.013 298	10.80082	23.26967
127	2 048 383	5.026 526	10.82932	23.33107
128	2 097 152	5.039 684	10.85767	23.39214
129	2 146 689	5.052 774	10.88587	23.45290
130	2 197 000	5.065 797	10.91393	23.51335
131	2 248 091	5.078 753	10.94184	23.57348
132	2 299 968	5.091 643	10.96961	23.63332
133	2 352 637	5.104 469	10.99724	23.69285
134	2 406 104	5.117 230	11.02474	23.75208
135	2 460 375	5.129 928	11.05209	23.81102
136	2 515 456	5.142 563	11.07932	23.86966
137	2 571 353	5.155 137	11.10641	23.92803
138	2 628 072	5.167 649	11.13336	23.98610
139	2 685 619	5.180 101	11.16019	24.04390
140	2 744 000	5.192 494	11.18689	24.10142
141	2 803 221	5.204 828	11.21346	24.15867
142	2 863 288	5.217 103	11.23991	24.21565
143	2 924 207	5.229 322	11.26623	24.27236
144	2 985 984	5.241 483	11.29243	24.32881
145	3 048 625	5.253 588	11.31851	24.38499
146	3 112 136	5.265 637	11.34447	24.44092
147	3 176 523	5.277 632	11.37031	24.49660
148	3 241 792	5.289 572	11.39604	24.55202
149	3 307 949	5.301 459	11.42165	24.60719
150	3 375 000	5.313 293	11.44714	24.66212

n	n^3	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
150	3 375 000	5.313 293	11.44714	24.66212
151	3 442 951	5.325 074	11.47252	24.71680
152	3 511 808	5.336 803	11.49779	24.77125
153	3 581 577	5.348 481	11.52295	24.82545
154	3 652 264	5.360 108	11.54800	24.87942
155	3 723 875	5.371 685	11 57295	24.93315
156	3 796 416	5.383 213	11.59778	24.98666
157	3 869 893	5.394 691	11.62251	25.03994
158	3 944 312	5.406 120	11.64713	25.09299
159	4 019 679	5.417 502	11.67165	25.14581
160	4 096 000	5.428 835	11.69607	25.19842
161	4 173 281	5.440 122	11.72039	25.25081
162	4 251 528	5.451 362	11.74460	25.30298
163	4 330 747	5.462 556	11.76872	25.35494
164	4 410 944	5.473 704	11.79274	25.40668
165	4 492 125	5.484 807	11.81666	25.45822
166	4 574 296	5.495 865	11.84048	25.50954
167	4 657 463	5.506 878	11.86421	25.56067
168	4 741 632	5.517 848	11.88784	25.61158
169	4 826 809	5.528 775	11.91138	25.66230
170	4 913 000	5.539 658	11.93483	25.71282
171	5 000 211	5.550 499	11.95819	25.76313
172	5 088 448	5.561 298	11.98145	25.81326
173	5 177 717	5.572 055	12.00463	25.86319
174	5 268 024	5.582 770	12.02771	25.91292
175	5 359 375	5.593 445	12.05071	25.96247
176	5 451 776	5.604 079	12.07362	26.01183
177	5 545 233	5.614 672	12.09645	26.06100
178	5 639 752	5.625 226	12.11918	26.10999
179	5 735 339	5.635 741	12.14184	26.15879
180	5 832 000	5.646 216	12.16440	26.20741
181	5 929 741	5.656 653	12.18689	26.25586
182	6 028 568	5.667 051	12.20929	26.30412
183	6 128 487	5.677 411	12.23161	26.35221
184	6 229 504	5.687 734	12.25385	26.40012
185	6 331 625	5.698 019	12.27601	26.44786
186	6 434 856	5.708 267	12.29809	26.49543
187	6 539 203	5.718 479	12.32009	26.54283
188	6 644 672	5.728 654	12.34201	26.59006
189	6 751 269	5.738 794	12.36386	26.63712
190	6 859 000	5.748 897	12.38562	26.68402
191	6 967 871	5.758 965	12.40731	26.73075
192	7 077 888	5.768 998	12.42893	26.77732
193	7 189 057	5.778 997	12.45047	26.82373
194	7 301 384	5.788 960	12.47194	26.86997
195	7 414 875	5.798 890	12.49333	26.91606
196	7 529 536	5.808 786	12.51465	26.96199
197	7 645 373	5.818 648	12.53590	27.00777
198	7 762 392	5.828 477	12.55707	27.05339
199	7 880 599	5.838 272	12.57818	27.09886
200	8 000 000	5.848 035	12.59921	27.14418

CUBES AND CUBE ROOTS

n	n^3	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
200	8 000 000	5.848 035	12.59921	27.14418
201	8 120 601	5.857 766	12.62017	27.18934
202	8 242 408	5.867 464	12.64107	27.23436
203	8 365 427	5.877 131	12.66189	27.27922
204	8 489 664	5.886 765	12.68265	27.32394
205	8 615 125	5.896 369	12.70334	27.36852
206	8 741 816	5.905 941	12.72396	27.41295
207	8 869 743	5.915 482	12.74452	27.45723
208	8 998 912	5.924 992	12.76501	27.50138
209	9 129 329	5.934 472	12.78543	27.54538
210	9 261 000	5.943 922	12.80579	27.58924
211	9 393 931	5.953 342	12.82609	27.63296
212	9 528 128	5.962 732	12.84632	27.67655
213	9 663 597	5.972 093	12.86648	27.72000
214	9 800 344	5.981 424	12.88659	27.76331
215	9 938 375	5.990 726	12.90663	27.80649
216	10 077 696	6.000 000	12.92661	27.84953
217	10 218 313	6.009 245	12.94653	27.89244
218	10 360 232	6.018 462	12.96638	27.93522
219	10 503 459	6.027 650	12.98618	27.97787
220	10 648 000	6.036 811	13.00591	28.02039
221	10 793 861	6.045 944	13.02559	28.06278
222	10 941 048	6.055 049	13.04521	28.10505
223	11 089 567	6.064 127	13.06477	28.14718
224	11 239 424	6.073 178	13.08427	28.18919
225	11 390 625	6.082 202	13.10371	28.23108
226	11 543 176	6.091 199	13.12309	28.27284
227	11 697 083	6.100 170	13.14242	28.31448
228	11 852 352	6.109 115	13.16169	28.35600
229	12 008 989	6.118 033	13.18090	28.39739
230	12 167 000	6.126 926	13.20006	28.43867
231	12 326 391	6.135 792	13.21916	28.47983
232	12 487 168	6.144 634	13.23821	28.52086
233	12 649 337	6.153 449	13.25721	28.56178
234	12 812 904	6.162 240	13.27614	28.60259
235	12 977 875	6.171 006	13.29503	28.64327
236	13 144 256	6.179 747	13.31386	28.68384
237	13 312 053	6.188 463	13.33264	28.72430
238	13 481 272	6.197 154	13.35136	28.76464
239	13 651 919	6.205 822	13.37004	28.80487
240	13 824 000	6.214 465	13.38866	28.84499
241	13 997 521	6.223 084	13.40723	28.88500
242	14 172 488	6.231 680	13.42575	28.92489
243	14 348 907	6.240 251	13.44421	28.96468
244	14 526 784	6.248 800	13.46263	29.00436
245	14 706 125	6.257 325	13.48100	29.04393
246	14 886 936	6.265 827	13.49931	29.08339
247	15 069 223	6.274 305	13.51758	29.12275
248	15 252 992	6.282 761	13.53580	29.16199
249	15 438 249	6.291 195	13.55397	29.20114
250	15 625 000	6.299 605	13.57209	29.24018

n	n^3	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
250	15 625 000	6.299 605	13.57209	29.24018
251	15 813 251	6.307 994	13.59016	29.27911
252	16 003 008	6.316 360	13.60818	29.31794
253	16 194 277	6.324 704	13.62616	29.35667
254	16 387 064	6.333 026	13.64409	29.39530
255	16 581 375	6.341 326	13.66197	29.43383
256	16 777 216	6.349 604	13.67981	29.47225
257	16 974 593	6.357 861	13.69760	29.51058
258	17 173 512	6.366 097	13.71534	29.54880
259	17 373 979	6.374 311	13.73304	29.58693
260	17 576 000	6.382 504	13.75069	29.62496
261	17 779 581	6.390 677	13.76830	29.66289
262	17 984 728	6.398 828	13.78586	29 70073
263	18 191 447	6.406 959	13.80337	29.73847
264	18 399 744	6.415 069	13.82085	29.77611
265	18 609 625	6.423 158	13.83828	29.81366
266	18 821 096	6.431 228	13.85566	29.85111
267	19 034 163	6.439 277	13.87300	29.88847
268	19 248 832	6.447 306	13.89030	29.92574
269	19 465 109	6.455 315	13.90755	29.96292
270	19 683 000	6.463 304	13.92477	30.00000
271	19 902 511	6.471 274	13.94194	30.03699
272	20 123 648	6.479 224	13.95906	30.07389
273	20 346 417	6.487 154	13.97615	30.11070
274	20 570 824	6.495 065	13.99319	30.14742
275	20 796 875	6.502 957	14.01020	30.18405
276	21 024 576	6.510 830	14.02716	30.22060
277	21 253 933	6.518 684	14.04408	30.25705
278	21 484 952	6.526 519	14.06096	30.29342
279	21 717 639	6.534 335	14.07780	30.32970
280	21 952 000	6.542 133	14.09460	30.36589
281	22 188 041	6.549 912	14.11136	30.40200
282	22 425 768	6.557 672	14.12808	30.43802
283	22 665 187	6.565 414	14.14476	30.47395
284	22 906 304	6.573 138	14.16140	30.50981
285	23 149 125	6.580 844	14.17800	30.54557
286	23 393 656	6.588 532	14.19456	30.58126
287	23 639 903	6.506 202	14.21109	30.61686
288	23 887 872	6.603 854	14.22757	30.65238
289	24 137 569	6.611 489	14.24402	30.68781
290	24 389 000	6.619 106	14.26043	30.72317
291	24 642 171	6.626 705	14.27680	30.75844
292	24 897 088	6.634 287	14.29314	30.79363
293	25 153 757	6.641 852	14.30944	30.82875
294	25 412 184	6.649 400	14.32570	30.86378
295	25 672 375	6.656 930	14.34192	30.89873
296	25 934 336	6.664 444	14.35811	30.93361
297	26 198 073	6.671 940	14.37426	30.96840
298	26 463 592	6.679 420	14.39037	31.00312
299	26 730 899	6.686 883	14.40645	31.03776
300	27 000 000	6.694 330	14.42250	31 07233

CUBES AND CUBE ROOTS

n	n^3	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
300	27 000 000	6.694 330	14.42250	31.07233
301	27 270 901	6.701 759	14.43850	31.10681
302	27 543 608	6.709 173	14.45447	31.14122
303	27 818 127	6.716 570	14.47041	31.17556
304	28 094 464	6.723 951	14.48631	31.20982
305	28 372 625	6.731 315	14.50218	31.24400
306	28 652 616	6.738 664	14.51801	31.27811
307	28 934 443	6.745 997	14.53381	31.31214
308	29 218 112	6.753 313	14.54957	31.34610
309	29 503 629	6.760 614	14.56530	31.37999
310	29 791 000	6.767 899	14.58100	31.41381
311	30 080 231	6.775 169	14.59666	31.44755
312	30 371 328	6.782 423	14.61229	31.48122
313	30 664 297	6 789 661	14.62788	31.51482
314	30 959 144	6.796 884	14.64344	31.54834
315	31 255 875	6.804 092	14.65897	31.58180
316	31 554 496	6.811 285	14.67447	31.61518
317	31 855 013	6.818 462	14.68993	31.64850
318	32 157 432	6.825 624	14.70536	31.68174
319	32 461 759	6.832 771	14.72076	31.71492
320	32 768 000	6.839 904	14.73613	31.74802
321	33 076 161	6.847 021	14.75146	31.78106
322	33 386 248	6.854 124	14.76676	31.81403
323	33 698 267	6.861 212	14.78203	31.84693
324	34 012 224	6.868 285	14.79727	31.87976
325	34 328 125	6.875 344	14.81248	31.91252
326	34 645 976	6.882 389	14.82766	31.94522
327	34 965 783	6.889 419	14.84280	31.97785
328	35 287 552	6.896 434	14.85792	32.01041
329	35 611 289	6.903 436	14.87300	32.04291
330	35 937 000	6.910 423	14.88806	32.07534
331	36 264 691	6.917 396	14.90308	32.10771
332	36 594 368	6.924 356	14.91807	32.14001
333	36 926 037	6.931 301	14.93303	32.17225
334	37 259 704	6.938 232	14.94797	32.20442
335	37 595 375	6.945 150	14.96287	32.23653
336	37 933 056	6.952 053	14.97774	32.26857
337	38 272 753	6.958 943	14.99259	32.30055
338	38 614 472	6.965 820	15.00740	32 33247
339	38 958 219	6.972 683	15.02219	32.36433
340	39 304 000	6.979 532	15.03695	32.39612
341	39 651 821	6.986 368	15.05167	32.42785
342	40 001 688	6.993 191	15.06637	32.45952
343	40 353 607	7.000 000	15.08104	32.49112
344	40 707 584	7.006 796	15.09568	32.52267
345	41 063 625	7.013 579	15.11030	32.55415
346	41 421 736	7.020 349	15.12488	32.58557
347	41 781 923	7.027 106	15.13944	32.61694
348	42 144 192	7.033 850	15.15397	32.64824
349	42 508 549	7.040 581	15.16847	32.67948
350	42 875 000	7.047 299	15.18294	32.71066

n	n^3	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
350	42 875 000	7.047 299	15.18294	32.71066
351	43 243 551	7.054 004	15.19739	32.74179
352	43 614 208	7.060 697	15.21181	32.77285
353	43 986 977	7.067 377	15.22620	32.80386
354	44 361 864	7.074 044	15.24057	32.83480
355	44 738 875	7.080 699	15.25490	32.86569
356	45 118 016	7.087 341	15.26921	32.89652
357	45 499 293	7.093 971	15.28350	32.92730
358	45 882 712	7.100 588	15.29775	32.95801
359	46 268 279	7.107 194	15.31198	32.98867
360	46 656 000	7.113 787	15.32619	32.01927
361	47 045 881	7.120 367	15.34037	33.04982
362	47 437 928	7.126 936	15.35452	33.08031
363	47 832 147	7.133 492	15.36864	33.11074
364	48 228 544	7.140 037	15.38274	33.14112
365	48 627 125	7.146 569	15.39682	33.17144
366	49 027 896	7.153 090	15.41087	33.20170
367	49 430 863	7.159 599	15.42489	33.23191
368	49 836 032	7.166 096	15.43889	33.26207
369	50 243 409	7.172 581	15.45286	33.29217
370	50 653 000	7.179 054	15.46680	33.32222
371	51 064 811	7.185 516	15.48073	33.35221
372	51 478 848	7.191 966	15.49462	33.38215
373	51 895 117	7.198 405	15.50849	33.41204
374	52 313 624	7.204 832	15.52234	33.44187
375	52 734 375	7.211 248	15.53616	33.47165
376	53 157 376	7.217 652	15.54996	33.50137
377	53 582 633	7.224 045	15.56373	33.53105
378	54 010 152	7.230 427	15.57748	33.56067
379	54 439 939	7.236 797	15.59121	33.59024
380	54 872 000	7.243 156	15.60491	33.61975
381	55 306 341	7.249 505	15.61858	33.64922
382	55 742 968	7.255 842	15.63224	33.67863
383	56 181 887	7.262 167	15.64587	33.70800
384	56 623 104	7.268 482	15.65947	33.73731
385	57 066 625	7.274 786	15.67305	33.76657
386	57 512 456	7.281 079	15.68661	33.79578
387	57 960 603	7.287 362	15.70014	33.82494
388	58 411 072	7.293 633	15.71366	33.85405
389	58 863 869	7.299 894	15.72714	33.88310
390	59 319 000	7.306 144	15.74061	33.91211
391	59 776 471	7.312 383	15.75405	33.94107
392	60 236 288	7.318 611	15.76747	33.96999
393	60 698 457	7.324 829	15.78087	33.99885
394	61 162 984	7.331 037	15.79424	34.02766
395	61 629 875	7.337 234	15.80759	34.05642
396	62 099 136	7.343 420	15.82092	34.08514
397	62 570 773	7.349 597	15.83423	34.11381
398	63 044 792	7.355 762	15.84751	34.14242
399	63 521 199	7.361 918	15.86077	34.17100
400	64 000 000	7.368 063	15.87401	34.19952

CUBES AND CUBE ROOTS

n	n^3	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
400	64 000 000	7.368 063	15.87401	34.19952
401	64 481 201	7.374 198	15.88723	34.22799
402	64 964 808	7.380 323	15.90042	34.25642
403	65 450 827	7.386 437	15.91360	34.28480
404	65 939 264	7.392 542	15.92675	34.31314
405	66 430 125	7.398 636	15.93988	34.34143
406	66 923 416	7.404 721	15.95299	34.36967
407	67 419 143	7.410 795	15.96607	34.39786
408	67 917 312	7.416 860	15.97914	34.42601
409	68 417 929	7.422 914	15.99218	34.45412
410	68 921 000	7.428 959	16.00521	34.48217
411	69 426 531	7.434 994	16.01821	34.51018
412	69 934 528	7.441 019	16.03119	34.53815
413	70 444 997	7.447 034	16.04415	34.56607
414	70 957 944	7.453 040	16.05709	34.59395
415	71 473 375	7.459 036	16.07001	34.62178
416	71 991 296	7.465 022	16.08290	34.64956
417	72 511 713	7.470 999	16.09578	34.67731
418	73 034 632	7.476 966	16.10864	34.70500
419	73 560 059	7.482 924	16.12147	34.73266
420	74 088 000	7.488 872	16.13429	34.76027
421	74 618 461	7.494 811	16.14708	34.78783
422	75 151 448	7.500 741	16.15986	34.81535
423	75 686 967	7.506 661	16.17261	34.84283
424	76 225 024	7.512 572	16.18534	34.87027
425	76 765 625	7.518 473	16.19806	34.89766
426	77 308 776	7.524 365	16.21075	34.92501
427	77 854 483	7.530 248	16.22343	34.95232
428	78 402 752	7.536 122	16.23608	34.97958
429	78 953 589	7.541 987	16.24872	35.00680
430	79 507 000	7.547 842	16.26133	35.03398
431	80 062 991	7.553 689	16.27393	35.06112
432	80 621 568	7.559 526	16.28651	35.08821
433	81 182 737	7.565 355	16.29906	35.11527
434	81 746 504	7.571 174	16.31160	35.14228
435	82 312 875	7.576 985	16.32412	35.16925
436	82 881 856	7.582 787	16.33662	35.19618
437	83 453 453	7.588 579	16.34910	35.22307
438	84 027 672	7.594 363	16.36156	35.24991
439	84 604 519	7.600 139	16.37400	35.27672
440	85 184 000	7.605 905	16.38643	35.30348
441	85 766 121	7.611 663	16.39883	35.33021
442	86 350 888	7.617 412	16.41122	35.35689
443	86 938 307	7.623 152	16.42358	35.38354
444	87 528 384	7.628 884	16.43593	35.41014
445	88 121 125	7.634 607	16.44826	35.43671
446	88 716 536	7.640 321	16.46057	35.46323
447	89 314 623	7.646 027	16.47287	35.48971
448	89 915 392	7.651 725	16.48514	35.51616
449	90 518 849	7.657 414	16.49740	35.54257
450	91 125 000	7.663 094	16.50964	35.56893

n	n^3	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
450	91 125 000	7.663 094	16.50964	35.56893
451	91 733 851	7.668 766	16.52186	35.59526
452	92 345 408	7.674 430	16.53406	35.62155
453	92 959 677	7.680 086	16.54624	35.64780
454	93 576 664	7.685 733	16.55841	35.67401
455	94 196 375	7.691 372	16.57056	35.70018
456	94 818 816	7.697 002	16.58269	35.72632
457	95 443 993	7.702 625	16.59480	35.75242
458	96 071 912	7.708 239	16.60690	35.77848
459	96 702 579	7.713 845	16.61897	35.80450
460	97 336 000	7.719 443	16.63103	35.83048
461	97 972 181	7.725 032	16.64308	35.85642
462	98 611 128	7.730 614	16.65510	35.88233
463	99 252 847	7.736 188	16.66711	35.90820
464	99 897 344	7.741 753	16.67910	35.93404
465	100 544 625	7.747 311	16.69108	35.95983
466	101 194 696	7.752 861	16.70303	35.98559
467	101 847 563	7.758 402	16.71497	36.01131
468	102 503 232	7.763 936	16.72689	36.03700
469	103 161 709	7.769 462	16.73880	36.06265
470	103 823 000	7.774 980	16.75069	36.08826
471	104 487 111	7.780 490	16.76256	36.11384
472	105 154 048	7.785 993	16.77441	36.13938
473	105 823 817	7.791 488	16.78625	36.16488
474	106 496 424	7.796 975	16.79807	36.19035
475	107 171 875	7.802 454	16.80988	36.21578
476	107 850 176	7.807 925	16.82167	36.24118
477	108 531 333	7.813 389	16.83344	36.26654
478	109 215 352	7.818 846	16.84519	36.29187
479	109 902 239	7.824 294	16.85693	36.31716
480	110 592 000	7.829 735	16.86865	36.34241
481	111 284 641	7.835 169	16.88036	36.36763
482	111 980 168	7.840 595	16.89205	36.39282
483	112 678 587	7.846 013	16.90372	36.41797
484	113 379 904	7.851 424	16.91538	36.44308
485	114 084 125	7.856 828	16.92702	36.46817
486	114 791 256	7.862 224	16.93865	36.49321
487	115 501 303	7.867 613	16.95026	36.51822
488	116 214 272	7.872 994	16.96185	36.54320
489	116 930 169	7.878 368	16.97343	36.56815
490	117 649 000	7.883 735	16.98499	36.59306
491	118 370 771	7.889 095	16.99654	36.61793
492	119 095 488	7.894 447	17.00807	36.64278
493	119 823 157	7.899 792	17.01959	36.66758
494	120 553 784	7.905 129	17.03108	36.69236
495	121 287 375	7.910 460	17.04257	36.71716
496	122 023 936	7.915 783	17.05404	36.74181
497	122 763 473	7.921 099	17.06549	36.76649
498	123 505 992	7.926 408	17.07693	36.79113
499	124 251 499	7.931 710	17.08835	36.81574
500	125 000 000	7.937 005	17.09976	36.84031

CUBES AND CUBE ROOTS

n	n^3	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
500	125 000 000	7.937 005	17.09976	36.84031
501	125 751 501	7.942 293	17.11115	36.80486
502	126 506 008	7.947 574	17.12253	36.88937
503	127 263 527	7.952 848	17.13389	36.91385
504	128 024 064	7.958 114	17.14524	36.93830
505	128 787 625	7.963 374	17.15657	36.96271
506	129 554 216	7.968 627	17.16789	36.98709
507	130 323 843	7.973 873	17.17919	37.01144
508	131 096 512	7.979 112	17.19048	37.03576
509	131 872 229	7.984 344	17.20175	37.06004
510	132 651 000	7.989 570	17.21301	37.08430
511	133 432 831	7.994 788	17.22425	37.10852
512	134 217 728	8.000 000	17.23548	37.13271
513	135 005 697	8.005 205	17.24669	37.15687
514	135 796 744	8.010 403	17.25789	37.18100
515	136 590 875	8.015 595	17.26908	37.20509
516	137 388 096	8.020 779	17.28025	37.22916
517	138 188 413	8.025 957	17.29140	37.25319
518	138 991 832	8.031 129	17.30254	37.27720
519	139 798 359	8.036 293	17.31367	37.30117
520	140 608 000	8.041 452	17.32478	37.32511
521	141 420 761	8.046 603	17.33588	37.34902
522	142 236 648	8.051 748	17.34696	37.37290
523	143 055 667	8.056 886	17.35804	37.39675
524	143 877 824	8.062 018	17.36909	37.42057
525	144 703 125	8.067 143	17.38013	37.44436
526	145 531 576	8.072 262	17.39116	37.46812
527	146 363 183	8.077 374	17.40218	37.49185
528	147 197 952	8.082 480	17.41318	37.51555
529	148 035 889	8.087 579	17.42416	37.53922
530	148 877 000	8.092 672	17.43513	37.56286
531	149 721 291	8.097 759	17.44609	37.58647
532	150 568 768	8.102 839	17.45704	37.61005
533	151 419 437	8.107 913	17.46797	37.63360
534	152 273 304	8.112 980	17.47889	37.65712
535	153 130 375	8.118 041	17.48979	37.68061
536	153 990 656	8.123 096	17.50068	37.70407
537	154 854 153	8.128 145	17.51156	37.72751
538	155 720 872	8.133 187	17.52242	37.75091
539	156 590 819	8.138 223	17.53327	37.77429
540	157 464 000	8.143 253	17.54411	37.79763
541	158 340 421	8.148 276	17.55493	37.82095
542	159 220 088	8.153 294	17.56574	37.84424
543	160 103 007	8.158 305	17.57654	37.86750
544	160 989 184	8.163 310	17.58732	37.89073
545	161 878 625	8.168 309	17.59809	37.91393
546	162 771 336	8.173 302	17.60885	37.93711
547	163 667 323	8.178 289	17.61959	37.96025
548	164 566 592	8.183 269	17.63032	37.98337
549	165 469 149	8.188 244	17.64104	38.00646
550	166 375 000	8.103 213	17.65174	38.02952

n	n^3	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
550	166 375 000	8.193 213	17.65174	38.02952
551	167 284 151	8.198 175	17.66243	38 05256
552	168 196 608	8.203 132	17.67311	38.07557
553	169 112 377	8.208 082	17.68378	38.09854
554	170 031 464	8.213 027	17.69443	38.12149
555	170 953 875	8.217 966	17.70507	38.14442
556	171 879 616	8.222 899	17.71570	38.16731
557	172 808 693	8.227 825	17.72631	38.19018
558	173 741 112	8.232 746	17.73691	38.21302
559	174 676 879	8.237 661	17.74750	38.23584
560	175 616 000	8.242 571	17.75808	38.25862
561	176 558 481	8.247 474	17.76864	38.28138
562	177 504 328	8.252 372	17.77920	38.30412
563	178 453 547	8.257 263	17.78973	38.32682
564	179 406 144	8.262 149	17.80026	38.34950
565	180 362 125	8.267 029	17.81077	38.37215
566	181 321 496	8.271 904	17.82128	38.39478
567	182 284 263	8.276 773	17.83177	38.41737
568	183 250 432	8.281 635	17.84224	38.43995
569	184 220 009	8.286 493	17.85271	38.46249
570	185 193 000	8.291 344	17.86316	38.48501
571	186 169 411	8.296 190	17.87360	38.50750
572	187 149 248	8.301 031	17.88403	38.52997
573	188 132 517	8.305 865	17.89444	38.55241
574	189 119 224	8.310 694	17.90485	38.57482
575	190 109 375	8.315 517	17.91524	38.59721
576	191 102 976	8.320 335	17.92562	38.61958
577	192 100 033	8.325 148	17.93599	38.64191
578	193 100 552	8.329 954	17.94634	38.66422
579	194 104 539	8.334 755	17.95669	38.68651
580	195 112 000	8.339 551	17.96702	38 70877
581	196 122 941	8.344 341	17.97734	38.73100
582	197 137 368	8.349 126	17.98765	38.75321
583	198 155 287	8.353 905	17.99794	38.77539
584	199 176 704	8.358 678	18.00823	38.79755
585	200 201 625	8.363 447	18.01850	38.81968
586	201 230 056	8.368 209	18.02876	38.84179
587	202 262 003	8.372 967	18.03901	38.86387
588	203 297 472	8.377 719	18.04925	38.88593
589	204 336 469	8.382 465	18.05947	38.90796
590	205 379 000	8.387 207	18.06969	38.92996
591	206 425 071	8.391 942	18.07989	38.95195
592	207 474 688	8.396 673	18.09008	38.97390
593	208 527 857	8.401 398	18.10026	38 99584
594	209 584 584	8.406 118	18.11043	39.01774
595	210 644 875	8.410 833	18.12059	39.03963
596	211 703 736	8.415 542	18.13074	39.06149
597	212 776 173	8.420 246	18.14087	39.08332
598	213 847 192	8.424 945	18.15099	39.10513
590	214 921 799	8.429 638	18 16111	39.12692
600	216 000 000	8.434 327	18.17121	39.14868

CUBES AND CUBE ROOTS

n	n^3	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
600	216 000 000	8.434 327	18.17121	39.14868
601	217 081 801	8.439 010	18.18130	39.17041
602	218 167 208	8.443 688	18.19137	39.19213
603	219 256 227	8.448 361	18.20144	39.21382
604	220 348 864	8.453 028	18.21150	39.23548
605	221 445 125	8.457 691	18.22154	39.25712
606	222 545 016	8.462 348	18.23158	39.27874
607	223 648 543	8.467 000	18.24160	39.30033
608	224 755 712	8.471 647	18.25161	39.32190
609	225 866 529	8.476 289	18.26161	39.34345
610	226 981 000	8.480 926	18.27160	39.36497
611	228 099 131	8.485 558	18.28158	39.38647
612	229 220 928	8.490 185	18.29155	39.40795
613	230 346 397	8.494 807	18.30151	39.42940
614	231 475 544	8.499 423	18.31145	39.45083
615	232 608 375	8.504 035	18.32139	39.47223
616	233 744 896	8.508 642	18.33131	39.49362
617	234 885 113	8.513 243	18.34123	39.51498
618	236 029 032	8.517 840	18.35113	39.53631
619	237 176 659	8.522 432	18.36102	39.55763
620	238 328 000	8.527 019	18.37091	39.57892
621	239 483 061	8.531 601	18.38078	39.60018
622	240 641 848	8.536 178	18.39064	39.62143
623	241 804 367	8.540 750	18.40049	39.64265
624	242 970 624	8.545 317	18.41033	39.66385
625	244 140 625	8.549 880	18.42016	39.68503
626	245 314 376	8.554 437	18.42998	39.70618
627	246 491 883	8.558 990	18.43978	39.72731
628	247 673 152	8.563 538	18.44958	39.74842
629	248 858 189	8.568 081	18.45937	39.76951
630	250 047 000	8.572 619	18.46915	39.79057
631	251 239 591	8.577 152	18.47891	39.81161
632	252 435 968	8.581 681	18.48867	39.83263
633	253 636 137	8.586 205	18.49842	39.85363
634	254 840 104	8.590 724	18.50815	39.87461
635	256 047 875	8.595 238	18.51788	39.89556
636	257 259 456	8.599 748	18.52759	39.91649
637	258 474 853	8.604 252	18.53730	39.93740
638	259 694 072	8.608 753	18.54700	39.95829
639	260 917 119	8.613 248	18.55668	39.97916
640	262 144 000	8.617.739	18.56636	40.00000
641	263 374 721	8.622 225	18.57602	40.02082
642	264 609 288	8.626 706	18.58568	40.04162
643	265 847 707	8.631 183	18.59532	40.06240
644	267 080 984	8.635 655	18.60495	40.08316
645	268 336 125	8.640 123	18.61458	40.10390
646	269 586 136	8.644 585	18.62419	40.12461
647	270 840 023	8.649 044	18.63380	40.14530
648	272 097 792	8.653 497	18.64340	40.16598
649	273 359 449	8.657 947	18.65298	40.18663
650	274 625 000	8.662 391	18.66256	40.20726

n	n^3	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
650	274 625 000	8.662 391	18.66256	40.20726
651	275 894 451	8.666 831	18.67212	40.22787
652	277 167 808	8.671 266	18.68168	40.24845
653	278 445 077	8.675 697	18.69122	40.26902
654	279 726 264	8.680 124	18.70076	40.28957
655	281 011 375	8.684 546	18.71029	40.31009
656	282 300 416	8.688 963	18.71980	40.33059
657	283 593 393	8.693 376	18.72931	40.35108
658	284 890 312	8.697 784	18.73881	40.37154
659	286 191 179	8.702 188	18.74830	40.39198
660	287 496 000	8.706 588	18.75777	40.41240
661	288 804 781	8.710 983	18.76724	40.43280
662	290 117 528	8.715 373	18.77670	40.45318
663	291 434 247	8.719 760	18.78615	40.47354
664	292 754 944	8.724 141	18.79559	40.49388
665	294 079 625	8.728 519	18.80502	40.51420
666	295 408 296	8.732 892	18.81444	40.53449
667	296 740 963	8.737 260	18.82386	40.55477
668	298 077 632	8.741 625	18.83326	40.57503
669	299 418 309	8.745 985	18.84265	40.59526
670	300 763 000	8.750 340	18.85204	40.61548
671	302 111 711	8.754 691	18.86141	40.63568
672	303 464 448	8.759 038	18.87078	40.65585
673	304 821 217	8.763 381	18.88013	40.67601
674	306 182 024	8.767 719	18.88948	40.69615
675	307 546 875	8.772 053	18.89882	40.71626
676	308 915 776	8.776 383	18.90814	40.73636
677	310 288 733	8.780 708	18.91746	40.75644
678	311 665 752	8.785 030	18.92677	40.77650
679	313 046 839	8.789 347	18.93607	40.79653
680	314 432 000	8.793 659	18.94536	40.81655
681	315 821 241	8.797 968	18.95465	40.83655
682	317 214 568	8.802 272	18.96392	40.85653
683	318 611 987	8.806 572	18.97318	40.87649
684	320 013 504	8.810 868	18.98244	40.89643
685	321 419 125	8.815 160	18.99169	40.91635
686	322 828 856	8.819 447	19.00092	40.93625
687	324 242 703	8.823 731	19.01015	40.95613
688	325 660 672	8.828 010	19.01937	40.97599
689	327 082 769	8.832 285	19.02858	40.99584
690	328 509 000	8.836 556	19.03778	41.01566
691	329 939 371	8.840 823	19.04698	41.03546
692	331 373 888	8.845 085	19.05616	41.05525
693	332 812 557	8.849 344	19.06533	41.07502
694	334 255 384	8.853 599	19.07450	41.09476
695	335 702 375	8.857 849	19.08366	41.11449
696	337 153 536	8.862 095	19.09281	41.13420
697	338 608 873	8.866 338	19.10195	41.15389
698	340 068 392	8.870 576	19.11108	41.17357
699	341 532 099	8.874 810	19.12020	41.19322
700	343 000 000	8.879 040	19.12931	41.21285

CUBES AND CUBE ROOTS

n	n^3	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
700	343 000 000	8.879 040	19.12931	41 21285
701	344 472 101	8.883 266	19.13842	41.23247
702	345 948 408	8.887 488	19.14751	41.25207
703	347 428 927	8.891 706	19.15660	41.27164
704	348 913 664	8.895 920	19.16568	41.29120
705	350 402 625	8.900 130	19.17475	41.31075
706	351 895 816	8.904 337	19.18381	41.33027
707	353 393 243	8.908 539	19.19286	41.34977
708	354 894 912	8.912 737	19.20191	41.36926
709	356 400 829	8.916 931	19.21095	41.38873
710	357 911 000	8.921 121	19.21997	41.40818
711	359 425 431	8.925 308	19.22899	41.42761
712	360 944 128	8.929 490	19.23800	41.44702
713	362 467 097	8.933 669	19.24701	41.46642
714	363 994 344	8.937 843	19.25600	41.48579
715	365 525 875	8.942 014	19.26499	41.50515
716	367 061 696	8.946 181	19.27396	41.52449
717	368 601 813	8.950 344	19.28293	41.54382
718	370 146 232	8.954 503	19.29189	41.56312
719	371 694 959	8.958 658	19.30084	41.58241
720	373 248 000	8.962 809	19.30979	41.60168
721	374 805 361	8.966 957	19.31872	41.62093
722	376 367 048	8.971 101	19.32765	41.64016
723	377 933 067	8.975 241	19.33657	41.65938
724	379 503 424	8.979 377	19.34548	41.67857
725	381 078 125	8.983 509	19.35438	41.69775
726	382 657 176	8.987 637	19.36328	41.71692
727	384 240 583	8.991 762	19.37216	41.73606
728	385 828 352	8.995 883	19.38104	41.75519
729	387 420 489	9.000 000	19.38991	41.77430
730	389 017 000	9.004 113	19.39877	41.79339
731	390 617 891	9.008 223	19.40763	41.81247
732	392 223 168	9.012 329	19.41647	41.83152
733	393 832 837	9.016 431	19.42531	41.85056
734	395 446 904	9.020 529	19.43414	41.86959
735	397 065 375	9.024 624	19.44296	41.88859
736	398 688 256	9.028 715	19.45178	41.90758
737	400 315 553	9.032 802	19.46058	41.92655
738	401 947 272	9.036 886	19.46938	41.94551
739	403 583 419	9.040 966	19.47817	41.96444
740	405 224 000	9.045 042	19.48695	41.98336
741	406 869 021	9.049 114	19.49573	42.00227
742	408 518 488	9.053 183	19.50449	42.02115
743	410 172 407	9.057 248	19.51325	42.04002
744	411 830 784	9.061 310	19.52200	42.05887
745	413 493 625	9.065 368	19.53074	42.07771
746	415 160 936	9.069 422	19.53948	42.00653
747	416 832 723	9.073 473	19.54820	42.11533
748	418 508 992	9.077 520	19.55692	42.13411
749	420 189 749	9.081 563	19.56563	42.15288
750	421 875 000	9.085 603	19.57434	42.17163

n	n^3	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
750	421 875 000	9.085 603	19.57434	42.17163
751	423 564 751	9.089 639	19.58303	42.19037
752	425 259 008	9.093 672	19.59172	42.20909
753	426 957 777	9.097 701	19.60040	42.22779
754	428 661 064	9.101 727	19.60908	42.24647
755	430 368 875	9.105 748	19.61774	42.26514
756	432 081 216	9.109 767	19.62640	42.28379
757	433 798 093	9.113 782	19.63505	42.30243
758	435 519 512	9.117 793	19.64369	42.32105
759	437 245 479	9.121 801	19.65232	42.33965
760	438 976 000	9.125 805	19.66095	42.35824
761	440 711 081	9.129 806	19.66957	42.37681
762	442 450 728	9.133 803	19.67818	42.39536
763	444 194 947	9.137 797	19.68679	42.41390
764	445 943 744	9.141 787	19.69538	42.43242
765	447 697 125	9.145 774	19.70397	42.45092
766	449 455 096	9.149 758	19.71256	42.46941
767	451 217 663	9.153 738	19.72113	42.48789
768	452 984 832	9.157 714	19.72970	42.50634
769	454 756 609	9.161 687	19.73826	42.52478
770	456 533 000	9.165 656	19.74681	42.54321
771	458 314 011	9.169 623	19.75535	42.56162
772	460 099 648	9.173 585	19.76389	42.58001
773	461 889 917	9.177 544	19.77242	42.59839
774	463 684 824	9.181 500	19.78094	42.61675
775	465 484 375	9.185 453	19.78946	42.63509
776	467 288 576	9.189 402	19.79797	42.65342
777	469 097 433	9.193 347	19.80647	42.67174
778	470 910 952	9.197 290	19.81496	42.69004
779	472 729 139	9.201 229	19.82345	42.70832
780	474 552 000	9.205 164	19.83192	42.72659
781	476 379 541	9.209 096	19.84040	42.74484
782	478 211 768	9.213 025	19.84886	42.76307
783	480 048 687	9.216 950	19.85732	42.78129
784	481 890 304	9.220 873	19.86577	42.79950
785	483 736 625	9.224 791	19.87421	42.81769
786	485 587 656	9.228 707	19.88265	42.83586
787	487 443 403	9.232 619	19.89107	42.85402
788	489 303 872	9.236 528	19.89950	42.87216
789	491 169 069	9.240 433	19.90791	42.89029
790	493 039 000	9.244 335	19.91632	42.90840
791	494 913 671	9.248 234	19.92472	42.92650
792	496 793 088	9.252 130	19.93311	42.94458
793	498 677 257	9.256 022	19.94150	42.96265
794	500 566 184	9.259 911	19.94987	42.98070
795	502 459 875	9.263 797	19.95825	42.99874
796	504 358 336	9.267 680	19.96661	43.01676
797	506 261 573	9.271 559	19.97497	43.03477
798	508 169 592	9.275 435	19.98332	43.05276
799	510 082 399	9.279 308	19.99166	43.07073
800	512 000 000	9.283 178	20.00000	43.08869

TABLE 4. TABLE OF POWERS, 1–100, 4TH TO 8TH POWERS

n	n^4	n^5	n^6	n^7	n^8
1	1	1	1	1	1
2	16	32	64	128	256
3	81	243	729	2187	6561
4	256	1024	4096	16384	65536
5	625	3125	15625	78125	390625
6	1296	7776	46656	279936	1679616
7	2401	16807	117649	823543	5764801
8	4096	32768	262144	2097152	16777216
9	6561	59049	531441	4782969	43046721
					$\times 10^8$
10	10000	100000	1000000	10000000	1.000000
11	14641	161051	1771561	19487171	2.143589
12	20736	248832	2985984	35831808	4.299817
13	28561	371293	4826809	62748517	8.157307
14	38416	537824	7529536	105413504	14.757891
15	50625	759375	11390625	170859375	25.628906
16	65536	1048576	16777216	268435456	42.949673
17	83521	1419857	24137569	410338673	69.757574
18	104976	1889568	34012224	612220032	110.199606
19	130321	2476099	47045881	893871739	169.835630
				$\times 10^9$	$\times 10^{10}$
20	160000	3200000	64000000	1.280000	2.560000
21	194481	4084101	85766121	1.801089	3.782286
22	234256	5153632	113379904	2.494358	5.487587
23	279841	6436343	148035889	3.404825	7.831099
24	331776	7962624	191102976	4.586471	11.007531
25	390625	9765625	244140625	6.103516	15.258789
26	456976	11881376	308915776	8.031810	20.882706
27	531441	14348907	387420489	10.460353	28.242954
28	614656	17210368	481890304	13.492929	37.780200
29	707281	20511149	594823321	17.249876	50.024641
			$\times 10^8$	$\times 10^{10}$	$\times 10^{11}$
30	810000	24300000	7.290000	2.187000	6.561000
31	923521	28629151	8.875037	2.751261	8.528910
32	1048576	33554432	10.737418	3.435974	10.995116
33	1185921	39135393	12.914680	4.261844	14.064086
34	1336336	45435424	15.448044	5.252335	17.857939
35	1500625	52521875	18.382656	6.433930	22.518754
36	1679616	60466176	21.767823	7.836416	28.211099
37	1874161	69343957	25.657264	9.493188	35.124795
38	2085136	79235168	30.109364	11.441558	43.477921
39	2313441	90224199	35.187438	13.723101	53.520093
			$\times 10^9$	$\times 10^{10}$	$\times 10^{12}$
40	2560000	102400000	4.096000	16.384000	6.553600
41	2825761	115856201	4.750104	19.475427	7.984925
42	3111696	130691232	5.489032	23.053933	9.682652
43	3418801	147008443	6.321363	27.181861	11.688200
44	3748096	164916224	7.256314	31.927781	14.048224
45	4100625	184528125	8.303766	37.366945	16.815125
46	4477456	205962976	9.474297	43.581766	20.047612
47	4879681	229345007	10.779215	50.662312	23.811287
48	5308416	254803968	12.230590	58.706834	28.179280
49	5764801	282475249	13.841287	67.822307	33.232931
50	6250000	312500000	15.625000	78.125000	39.062500

Source: Reproduced from C. D. Hodgman, *Mathematical Tables* (7th ed.: Cleveland, Ohio: Chemical Rubber Publishing Co., 1941), pp. 194–195.

POWERS

n	n^4	n^5	n^6	n^7	n^8
			$\times 10^{9}$	$\times 10^{11}$	$\times 10^{13}$
50	6250000	312500000	15.625000	7.812500	3.906250
51	6765201	345025251	17.596288	8.974107	4.576794
52	7311616	380204032	19.770610	10.280717	5.345973
53	7890481	418195493	22.164361	11.747111	6.225969
54	8503056	459165024	24.794911	13.389252	7.230196
55	9150625	503284375	27.680641	15.224352	8.373394
56	9834496	550731776	30.840979	17.270948	9.671731
57	10556001	601692057	34.296447	19.548975	11.142916
58	11316496	656356768	38.068693	22.079842	12.806308
59	12117361	714924299	42.180534	24.886515	14.683044
		$\times 10^{8}$	$\times 10^{10}$	$\times 10^{11}$	$\times 10^{13}$
60	12960000	7.776000	4.665600	27.993600	16.796160
61	13845841	8.445963	5.152037	31.427428	19.170731
62	14776336	9.161328	5.680024	35.216146	21.834011
63	15752961	9.924365	6.252350	39.389806	24.815578
64	16777216	10.737418	6.871948	43.980465	28.147498
65	17850625	11.602906	7.541889	49.022279	31.864481
66	18974736	12.523326	8.265395	54.551607	36.004061
67	20151121	13.501251	9.045838	60.607116	40.606768
68	21381376	14.539336	9.886748	67.229888	45.716324
69	22667121	15.640313	10.791816	74.463533	51.379837
		$\times 10^{8}$	$\times 10^{10}$	$\times 10^{12}$	$\times 10^{14}$
70	24010000	16.807000	11.764900	8.235430	5.764801
71	25411681	18.042294	12.810028	9.095120	6.457535
72	26873856	19.349176	13.931407	10.030613	7.222041
73	28398241	20.730716	15.133423	11.047399	8.064601
74	29986576	22.190066	16.420649	12.151280	8.991947
75	31640625	23.730469	17.797852	13.348389	10.011292
76	33362176	25.355254	19.269993	14.645195	11.130348
77	35153041	27.067842	20.842238	16.048523	12.357363
78	37015056	28.871744	22.519960	17.565569	13.701144
79	38950081	30.770564	24.308746	19.203909	15.171088
		$\times 10^{8}$	$\times 10^{10}$	$\times 10^{12}$	$\times 10^{14}$
80	40960000	32.768000	26.214400	20.971520	16.777216
81	43046721	34.867844	28.242954	22.876792	18.530202
82	45212176	37.073984	30.400667	24.928547	20.441409
83	47458321	39.390406	32.694037	27.136051	22.522922
84	49787136	41.821194	35.129803	29.509035	24.787589
85	52200625	44.370531	37.714952	32.057709	27.249053
86	54700816	47.042702	40.456724	34.792782	29.921793
87	57289761	49.842092	43.362620	37.725479	32.821167
88	59969536	52.773192	46.440409	40.867560	35.963452
89	62742241	55.840594	49.698129	44.231335	39.365888
		$\times 10^{9}$	$\times 10^{11}$	$\times 10^{13}$	$\times 10^{15}$
90	65610000	5.904900	5.314410	4.782969	4.304672
91	68574961	6.240321	5.678693	5.167610	4.702525
92	71639296	6.590815	6.063550	5.578466	5.132189
93	74805201	6.956884	6.469902	6.017009	5.595818
94	78074896	7.339040	6.898698	6.484776	6.095689
95	81450625	7.737809	7.350919	6.983373	6.634204
96	84934656	8.153727	7.827578	7.514475	7.213896
97	88529281	8.587340	8.329720	8.079828	7.837434
98	92236816	9.039208	8.858424	8.681255	8.507630
99	96059601	9.509900	9.414801	9.320653	9.227447
100	100000000	10.000000	10.000000	10.000000	10.000000

TABLE 5. TABLE OF COMMON LOGARITHMS — FIVE PLACE

0—50

N	L 0	1	2	3	4	5	6	7	8	9
0	— ∞	00 000	30 103	47 712	60 206	69 897	77 815	84 510	90 309	95 424
1	00 000	04 139	07 918	11 394	14 613	17 609	20 412	23 045̄	25 527	27 875
2	30 103	32 222	34 242	36 173	38 021	39 794	41 497	43 136	44 716	46 240
3	47 712	49 136	50 515̄	51 851	53 148	54 407	55 630	56 820	57 978	59 106
4	60 206	61 278	62 325̄	63 347	64 345	65 321	66 276	67 210	68 124	69 020
5	69 897	70 757	71 600	72 428	73 239	74 036	74 819	75 587	76 343	77 085
6	77 815	78 533	79 239	79 934	80 618	81 291	81 954	82 607	83 251	83 885̄
7	84 510	85 126	85 733	86 332	86 923	87 506	88 081	88 649	89 209	89 763
8	90 309	90 849	91 381	91 908	92 428	92 942	93 45̄0	93 952	94 448	94 939
9	95 424	95 904	96 379	96 848	97 313	97 772	98 227	98 677	99 123	99 564
10	00 000	00 432	00 860	01 284	01 703	02 119	02 531	02 938	03 342	03 743
11	04 139	04 532	04 922	05 308	05 690	06 070	06 446	06 819	07 188	07 555̄
12	07 918	08 279	08 636	08 991	09 342	09 691	10 037	10 380	10 721	11 059
13	11 394	11 727	12 057	12 385	12 710	13 033	13 354	13 672	13 988	14 301
14	14 613	14 922	15 229	15 534	15 836	16 137	16 435	16 732	17 026	17 319
15	17 609	17 898	18 184	18 469	18 752	19 033	19 312	19 590	19 866	20 140
16	20 412	20 683	20 952	21 219	21 484	21 748	22 011	22 272	22 531	22 789
17	23 045̄	23 300	23 553	23 805̄	24 055̄	24 304	24 551	24 797	25 042	25 285
18	25 527	25 768	26 007	26 245	26 482	26 717	26 951	27 184	27 416	27 646
19	27 875	28 103	28 330	28 556	28 780	29 003	29 226	29 447	29 667	29 885
20	30 103	30 320	30 535	30 75̄0	30 963	31 175	31 387	31 597	31 806	32 015̄
21	32 222	32 428	32 634	32 838	33 041	33 244	33 445	33 646	33 846	34 044
22	34 242	34 439	34 635	34 830	35 025̄	35 218	35 411	35 603	35 793	35 984
23	36 173	36 361	36 549	36 736	36 922	37 107	37 291	37 475̄	37 658	37 840
24	38 021	38 202	38 382	38 561	38 739	38 917	39 094	39 270	39 445	39 620
25	39 794	39 967	40 140	40 312	40 483	40 654	40 824	40 993	41 162	41 330
26	41 497	41 664	41 830	41 996	42 160	42 325̄	42 488	42 651	42 813	42 975
27	43 136	43 297	43 457	43 616	43 775	43 933	44 091	44 248	44 404	44 560
28	44 716	44 871	45 025̄	45 179	45 332	45 484	45 637	45 788	45 939	46 090
29	46 240	46 389	46 538	46 687	46 835̄	46 982	47 129	47 276	47 422	47 567
30	47 712	47 857	48 001	48 144	48 287	48 430	48 572	48 714	48 855	48 996
31	49 136	49 276	49 415	49 554	49 693	49 831	49 969	50 106	50 243	50 379
32	50 515̄	50 651	50 786	50 920	51 055̄	51 188	51 322	51 455̄	51 587	51 720
33	51 851	51 983	52 114	52 244	52 375̄	52 504	52 634	52 763	52 892	53 020
34	53 148	53 275	53 403	53 529	53 656	53 782	53 908	54 033	54 158	54 283
35	54 407	54 531	54 654	54 777	54 900	55 023	55 145̄	55 267	55 388	55 509
36	55 630	55 751	55 871	55 991	56 110	56 229	56 348	56 467	56 585̄	56 703
37	56 820	56 937	57 054	57 171	57 287	57 403	57 519	57 634	57 749	57 864
38	57 978	58 092	58 206	58 320	58 433	58 546	58 659	58 771	58 883	58 995̄
39	59 106	59 218	59 329	59 439	59 55̄0	59 660	59 770	59 879	59 988	60 097
40	60 206	60 314	60 423	60 531	60 638	60 746	60 853	60 959	61 066	61 172
41	61 278	61 384	61 490	61 595	61 700	61 805̄	61 909	62 014	62 118	62 221
42	62 325̄	62 428	62 531	62 634	62 737	62 839	62 941	63 043	63 144	63 246
43	63 347	63 448	63 548	63 649	63 749	63 849	63 949	64 048	64 147	64 246
44	64 345	64 444	64 542	64 640	64 738	64 836	64 933	65 031	65 128	65 225̄
45	65 321	65 418	65 514	65 610	65 706	65 801	65 896	65 992	66 087	66 181
46	66 276	66 370	66 464	66 558	66 652	66 745	66 839	66 932	67 025̄	67 117
47	67 210	67 302	67 394	67 486	67 578	67 669	67 761	67 852	67 943	68 034
48	68 124	68 215̄	68 305̄	68 395̄	68 485̄	68 574	68 664	68 753	68 842	68 931
49	69 020	69 108	69 197	69 285̄	69 373	69 461	69 548	69 636	69 723	69 810
50	69 897	69 984	70 070	70 157	70 243	70 329	70 415	70 501	70 586	70 672
N	L 0	1	2	3	4	5	6	7	8	9

Source: Kaj L. Nielsen, *Logarithmic and Trigonometric Tables* (New York: Barnes & Noble, 1947), pp. 2–21.

COMMON LOGARITHMS

50—100

N	L 0	1	2	3	4	5	6	7	8	9
50	69 897	69 984	70 070	70 157	70 243	70 329	70 415	70 501	70 586	70 672
51	70 757	70 842	70 927	71 012	71 096	71 181	71 265̄	71 349	71 433	71 517
52	71 600	71 684	71 767	71 850	71 933	72 016	72 099	72 181	72 263	72 346
53	72 428	72 509	72 591	72 673	72 754	72 835	72 916	72 997	73 078	73 159
54	73 239	73 320	73 400	73 480	73 560	73 640	73 719	73 799	73 878	73 957
55	74 036	74 115	74 194	74 273	74 351	74 429	74 507	74 586	74 663	74 741
56	74 819	74 896	74 974	75 051	75 128	75 205̄	75 282	75 358	75 435̄	75 511
57	75 587	75 664	75 740	75 815	75 891	75 967	76 042	76 118	76 193	76 268
58	76 343	76 418	76 492	76 567	76 641	76 716	76 790	76 864	76 938	77 012
59	77 085	77 159	77 232	77 305	77 379	77 452	77 525̄	77 597	77 670	77 743
60	77 815	77 887	77 960	78 032	78 104	78 176	78 247	78 319	78 390	78 462
61	78 533	78 604	78 675	78 746	78 817	78 888	78 958	79 029	79 099	79 169
62	79 239	79 309	79 379	79 449	79 518	79 588	79 657	79 727	79 796	79 865
63	79 934	80 003	80 072	80 140	80 209	80 277	80 346	80 414	80 482	80 550
64	80 618	80 686	80 754	80 821	80 889	80 956	81 023	81 090	81 158	81 224
65	81 291	81 358	81 425̄	81 491	81 558	81 624	81 690	81 757	81 823	81 889
66	81 954	82 020	82 086	82 151	82 217	82 282	82 347	82 413	82 478	82 543
67	82 607	82 672	82 737	82 802	82 866	82 930	82 995̄	83 059	83 123	83 187
68	83 251	83 315̄	83 378	83 442	83 506	83 569	83 632	83 696	83 759	83 822
69	83 885̄	83 948	84 011	84 073	84 136	84 198	84 261	84 323	84 386	84 448
70	84 510	84 572	84 634	84 696	84 757	84 819	84 880	84 942	85 003	85 065̄
71	85 126	85 187	85 248	85 309	85 370	85 431	85 491	85 552	85 612	85 673
72	85 733	85 794	85 854	85 914	85 974	86 034	86 094	86 153	86 213	86 273
73	86 332	86 392	86 451	86 510	86 570	86 629	86 688	86 747	86 806	86 864
74	86 923	86 982	87 040	87 099	87 157	87 216	87 274	87 332	87 390	87 448
75	87 506	87 564	87 622	87 679	87 737	87 795̄	87 852	87 910	87 967	88 024
76	88 081	88 138	88 195	88 252	88 309	88 366	88 423	88 480	88 536	88 593
77	88 649	88 705	88 762	88 818	88 874	88 930	88 986	89 042	89 098	89 154
78	89 209	89 265	89 321	89 376	89 432	89 487	89 542	89 597	89 653	89 708
79	89 763	89 818	89 873	89 927	89 982	90 037	90 091	90 146	90 200	90 255̄
80	90 309	90 363	90 417	90 472	90 526	90 580	90 634	90 687	90 741	90 795̄
81	90 849	90 902	90 956	91 009	91 062	91 116	91 169	91 222	91 275	91 328
82	91 381	91 434	91 487	91 540	91 593	91 645	91 698	91 751	91 803	91 855
83	91 908	91 960	92 012	92 065̄	92 117	92 169	92 221	92 273	92 324	92 376
84	92 428	92 480	92 531	92 583	92 634	92 686	92 737	92 788	92 840	92 891
85	92 942	92 993	93 044	93 095̄	93 146	93 197	93 247	93 298	93 349	93 399
86	93 45̄0	93 500	93 551	93 601	93 651	93 702	93 752	93 802	93 852	93 902
87	93 952	94 002	94 052	94 101	94 151	94 201	94 250	94 300	94 349	94 399
88	94 448	94 498	94 547	94 596	94 645	94 694	94 743	94 792	94 841	94 890
89	94 939	94 988	95 036	95 085	95 134	95 182	95 231	95 279	95 328	95 376
90	95 424	95 472	95 521	95 569	95 617	95 665̄	95 713	95 761	95 809	95 856
91	95 904	95 952	95 999	96 047	96 095̄	96 142	96 190	96 237	96 284	96 332
92	96 379	96 426	96 473	96 520	96 567	96 614	96 661	96 708	96 755̄	96 802
93	96 848	96 895̄	96 942	96 988	97 035̄	97 081	97 128	97 174	97 220	97 267
94	97 313	97 359	97 405	97 451	97 497	97 543	97 589	97 635̄	97 681	97 727
95	97 772	97 818	97 864	97 909	97 955̄	98 000	98 046	98 091	98 137	98 182
96	98 227	98 272	98 318	98 363	98 408	98 453	98 498	98 543	98 588	98 632
97	98 677	98 722	98 767	98 811	98 856	98 900	98 945̄	98 989	99 034	99 078
98	99 123	99 167	99 211	99 255	99 300	99 344	99 388	99 432	99 476	99 520
99	99 564	99 607	99 651	99 695̄	99 739	99 782	99 826	99 870	99 913	99 957
100	00 000	00 043	00 087	00 130	00 173	00 217	00 260	00 303	00 346	00 389
N	**L 0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**

COMMON LOGARITHMS

100—150

N	L 0	1	2	3	4	5	6	7	8	9
100	00 000	043	087	130	173	217	260	303	346	389
101	432	475	518	561	604	647	689	732	775̄	817
102	860	903	945	988	*030	*072	*115̄	*157	*199	*242
103	01 284	326	368	410	452	494	536	578	620	662
104	703	745	787	828	870	912	953	995̄	*036	*078
105	02 119	160	202	243	284	325	366	407	449	490
106	531	572	612	653	694	735̄	776	816	857	898
107	938	979	*019	*060	*100	*141	*181	*222	*262	*302
108	03 342	383	423	463	503	543	583	623	663	703
109	743	782	822	862	902	941	981	*021	*060	*100
110	04 139	179	218	258	297	336	376	415̄	454	493
111	532	571	610	65̄0	689	727	766	805	844	883
112	922	961	999	*038	*077	*115	*154	*192	*231	*269
113	05 308	346	385̄	423	461	5̄00	538	576	614	652
114	690	729	767	805̄	843	881	918	956	994	*032
115	06 070	108	145	183	221	258	296	333	371	408
116	446	483	521	558	595	633	670	707	744	781
117	819	856	893	930	967	*004	*041	*078	*115̄	*151
118	07 188	225̄	262	298	335	372	408	445	482	518
119	555̄	591	628	664	700	737	773	809	846	882
120	918	954	990	*027	*063	*099	*135̄	*171	*207	*243
121	08 279	314	350	386	422	458	493	529	565̄	600
122	636	672	707	743	778	814	849	884	920	955
123	991	*026	*061	*096	*132	*167	*202	*237	*272	*307
124	09 342	377	412	447	482	517	552	587	621	656
125	691	726	760	795	830	864	899	934	968	*003
126	10 037	072	106	140	175̄	209	243	278	312	346
127	380	415̄	449	483	517	551	585	619	653	687
128	721	755̄	789	823	857	890	924	958	992	*025
129	11 059	093	126	160	193	227	261	294	327	361
130	394	428	461	494	528	561	594	628	661	694
131	727	760	793	826	860	893	926	959	992	*024
132	12 057	090	123	156	189	222	254	287	320	352
133	385	418	450	483	516	548	581	613	646	678
134	710	743	775	808	840	872	905̄	937	969	*001
135	13 033	066	098	130	162	194	226	258	290	322
136	354	386	418	45̄0	481	513	545	577	609	640
137	672	704	735	767	799	830	862	893	925̄	956
138	988	*019	*051	*082	*114	*145̄	*176	*208	*239	*270
139	14 301	333	364	395	426	457	489	520	551	582
140	613	644	675̄	706	737	768	799	829	860	891
141	922	953	983	*014	*045̄	*076	*106	*137	*168	*198
142	15 229	259	290	320	351	381	412	442	473	503
143	534	564	594	625̄	655̄	685	715	746	776	806
144	836	866	897	927	957	987	*017	*047	*077	*107
145	16 137	167	197	227	256	286	316	346	376	406
146	435	465	495̄	524	554	584	613	643	673	702
147	732	761	791	820	85̄0	879	909	938	967	997
148	17 026	056	085̄	114	143	173	202	231	260	289
149	319	348	377	406	435	464	493	522	551	580
150	17 609	638	667	696	725̄	754	782	811	840	869
N	L 0	1	2	3	4	5	6	7	8	9

P P

	44	43	42
1	4.4	4.3	4.2
2	8.8	8.6	8.4
3	13.2	12.9	12.6
4	17.6	17.2	16.8
5	22.0	21.5	21.0
6	26.4	25.8	25.2
7	30.8	30.1	29.4
8	35.2	34.4	33.6
9	39.6	38.7	37.8

	41	40	39
1	4.1	4.0	3.9
2	8.2	8.0	7.8
3	12.3	12.0	11.7
4	16.4	16.0	15.6
5	20.5	20.0	19.5
6	24.6	24.0	23.4
7	28.7	28.0	27.3
8	32.8	32.0	31.2
9	36.9	36.0	35.1

	38	37	36
1	3.8	3.7	3.6
2	7.6	7.4	7.2
3	11.4	11.1	10.8
4	15.2	14.8	14.4
5	19.0	18.5	18.0
6	22.8	22.2	21.6
7	26.6	25.9	25.2
8	30.4	29.6	28.8
9	34.2	33.3	32.4

	35	34	33
1	3.5	3.4	3.3
2	7.0	6.8	6.6
3	10.5	10.2	9.9
4	14.0	13.6	13.2
5	17.5	17.0	16.5
6	21.0	20.4	19.8
7	24.5	23.8	23.1
8	28.0	27.2	26.4
9	31.5	30.6	29.7

	32	31	30
1	3.2	3.1	3.0
2	6.4	6.2	6.0
3	9.6	9.3	9.0
4	12.8	12.4	12.0
5	16.0	15.5	15.0
6	19.2	18.6	18.0
7	22.4	21.7	21.0
8	25.6	24.8	24.0
9	28.8	27.9	27.0

P P

COMMON LOGARITHMS

150—200

N	L 0	1	2	3	4	5	6	7	8	9
150	17 609	638	667	696	725̄	754	782	811	840	869
151	898	926	955	984	*013	*041	*070	*099	*127	*156
152	18 184	213	241	270	298	327	355	384	412	441
153	469	498	526	554	583	611	639	667	696	724
154	752	780	808	837	865̄	893	921	949	977	*005
155	19 033	061	089	117	145	173	201	229	257	285̄
156	312	340	368	396	424	451	479	507	535̄	562
157	590	618	645	673	700	728	756	783	811	838
158	866	893	921	948	976	*003	*030	*058	*085	*112
159	20 140	167	194	222	249	276	303	330	358	385̄
160	412	439	466	493	520	548	575̄	602	629	656
161	683	710	737	763	790	817	844	871	898	925̄
162	952	978	*005	*032	*059	*085	*112	*139	*165	*192
163	21 219	245	272	299	325	352	378	405̄	431	458
164	484	511	537	564	590	617	643	669	696	722
165	748	775̄	801	827	854	880	906	932	958	985̄
166	22 011	037	063	089	115	141	167	194	220	246
167	272	298	324	35̄0	376	401	427	453	479	505
168	531	557	583	608	634	660	686	712	737	763
169	789	814	840	866	891	917	943	968	994	*019
170	23 045̄	070	096	121	147	172	198	223	249	274
171	300	325	350	376	401	426	452	477	502	528
172	553	578	603	629	654	679	704	729	754	779
173	805̄	830	855̄	880	905̄	930	955̄	980	*005̄	*030
174	24 055̄	080	105̄	130	155̄	180	204	229	254	279
175	304	329	353	378	403	428	452	477	502	527
176	551	576	601	625	65̄0	674	699	724	748	773
177	797	822	846	871	895	920	944	969	993	*018
178	25 042	066	091	115	139	164	188	212	237	261
179	285	310	334	358	382	406	431	455̄	479	503
180	527	551	575	600	624	648	672	696	720	744
181	768	792	816	840	864	888	912	935	959	983
182	26 007	031	055̄	079	102	126	150	174	198	221
183	245	269	293	316	340	364	387	411	435̄	458
184	482	505	529	553	576	600	623	647	670	694
185	717	741	764	788	811	834	858	881	905̄	928
186	951	975̄	998	*021	*045̄	*068	*091	*114	*138	*161
187	27 184	207	231	254	277	300	323	346	370	393
188	416	439	462	485	508	531	554	577	600	623
189	646	669	692	715	738	761	784	807	830	852
190	875	898	921	944	967	989	*012	*035	*058	*081
191	28 103	126	149	171	194	217	240	262	285̄	307
192	330	353	375	398	421	443	466	488	511	533
193	556	578	601	623	646	668	691	713	735	758
194	780	803	825̄	847	870	892	914	937	959	981
195	29 003	026	048	070	092	115̄	137	159	181	203
196	226	248	270	292	314	336	358	380	403	425̄
197	447	469	491	513	535̄	557	579	601	623	645̄
198	667	688	710	732	754	776	798	820	842	863
199	885	907	929	951	973	994	*016	*038	*060	*081
200	30 103	125̄	146	168	190	211	233	255̄	276	298
N	L 0	1	2	3	4	5	6	7	8	9

P P

	29	28
1	2.9	2.8
2	5.8	5.6
3	8.7	8.4
4	11.6	11.2
5	14.5	14.0
6	17.4	16.8
7	20.3	19.6
8	23.2	22.4
9	26.1	25.2

	27	26
1	2.7	2.6
2	5.4	5.2
3	8.1	7.8
4	10.8	10.4
5	13.5	13.0
6	16.2	15.6
7	18.9	18.2
8	21.6	20.8
9	24.3	23.4

	25
1	2.5
2	5.0
3	7.5
4	10.0
5	12.5
6	15.0
7	17.5
8	20.0
9	22.5

	24	23
1	2.4	2.3
2	4.8	4.6
3	7.2	6.9
4	9.6	9.2
5	12.0	11.5
6	14.4	13.8
7	16.8	16.1
8	19.2	18.4
9	21.6	20.7

	22	21
1	2.2	2.1
2	4.4	4.2
3	6.6	6.3
4	8.8	8.4
5	11.0	10.5
6	13.2	12.6
7	15.4	14.7
8	17.6	16.8
9	19.8	18.9

P P

COMMON LOGARITHMS

200—250

N	L 0	1	2	3	4	5	6	7	8	9
200	30 103	125̄	146	168	190	211	233	255̄	276	298
201	320	341	363	384	406	428	449	471	492	514
202	535	557	578	600	621	643	664	685	707	728
203	75̄0	771	792	814	835	856	878	899	920	942
204	963	984	*006	*027	*048	*069	*091	*112	*133	*154
205	31 175	197	218	239	260	281	302	323	345̄	366
206	387	408	429	45̄0	471	492	513	534	555	576
207	597	618	639	660	681	702	723	744	765̄	785
208	806	827	848	869	890	911	931	952	973	994
209	32 015̄	035	056	077	098	118	139	160	181	201
210	222	243	263	284	305̄	325	346	366	387	408
211	428	449	469	490	510	531	552	572	593	613
212	634	654	675̄	695̄	715	736	756	777	797	818
213	838	858	879	899	919	940	960	980	*001	*021
214	33 041	062	082	102	122	143	163	183	203	224
215	244	264	284	304	325̄	345̄	365̄	385	405	425
216	445	465	486	506	526	546	566	586	606	626
217	646	666	686	706	726	746	766	786	806	826
218	846	866	885	905	925	945	965	985̄	*005̄	*025̄
219	34 044	064	084	104	124	143	163	183	203	223
220	242	262	282	301	321	341	361	380	400	420
221	439	459	479	498	518	537	557	577	596	616
222	635	655̄	674	694	713	733	753	772	792	811
223	830	85̄0	869	889	908	928	947	967	986	*005
224	35 025̄	044	064	083	102	122	141	160	180	199
225	218	238	257	276	295	315̄	334	353	372	392
226	411	430	449	468	488	507	526	545	564	583
227	603	622	641	660	679	698	717	736	755	774
228	793	813	832	851	870	889	908	927	946	965̄
229	984	*003	*021	*040	*059	*078	*097	*116	*135	*154
230	36 173̇	192	211	229	248	267	286	305̄	324	342
231	361	380	399	418	436	455	474	493	511	530
232	549	568	586	605̄	624	642	661	680	698	717
233	736	754	773	791	810	829	847	866	884	903
234	922	940	959	977	996	*014	*033	*051	*070	*088
235	37 107	125	144	162	181	199	218	236	254	273
236	291	310	328	346	365̄	383	401	420	438	457
237	475̄	493	511	530	548	566	585̄	603	621	639
238	658	676	694	712	731	749	767	785	803	822
239	840	858	876	894	912	931	949	967	985̄	*003
240	38 021	039	057	075	093	112	130	148	166	184
241	202	220	238	256	274	292	310	328	346	364
242	382	399	417	435	453	471	489	507	525̄	543
243	561	578	596	614	632	65̄0	668	686	703	721
244	739	757	775̄	792	810	828	846	863	881	899
245	917	934	952	970	987	*005	*023	*041	*058	*076
246	39 094	111	129	146	164	182	199	217	235̄	252
247	270	287	305̄	322	340	358	375	393	410	428
248	445	463	480	498	515	533	550	568	585	602
249	620	637	655̄	672	690	707	724	742	759	777
250	794	811	829	846	863	881	898	915	933	950
N	L 0	1	2	3	4	5	6	7	8	9

P P

	22	21
1	2.2	2.1
2	4.4	4.2
3	6.6	6.3
4	8.8	8.4
5	11.0	10.5
6	13.2	12.6
7	15.4	14.7
8	17.6	16.8
9	19.8	18.9

	20
1	2.0
2	4.0
3	6.0
4	8.0
5	10.0
6	12.0
7	14.0
8	16.0
9	18.0

	19
1	1.9
2	3.8
3	5.7
4	7.6
5	9.5
6	11.4
7	13.3
8	15.2
9	17.1

	18
1	1.8
2	3.6
3	5.4
4	7.2
5	9.0
6	10.8
7	12.6
8	14.4
9	16.2

	17
1	1.7
2	3.4
3	5.1
4	6.8
5	8.5
6	10.2
7	11.9
8	13.6
9	15.3

P P

COMMON LOGARITHMS

250—300

N	L 0	1	2	3	4	5	6	7	8	9
250	39 794	811	829	846	863	881	898	915	933	950
251	967	985̄	*002	*019	*037	*054	*071	*088	*106	*123
252	40 140	157	175̄	192	209	226	243	261	278	295̄
253	312	329	346	364	381	398	415̄	432	449	466
254	483	500	518	535̄	552	569	586	603	620	637
255	654	671	688	705	722	739	756	773	790	807
256	824	841	858	875̄	892	909	926	943	960	976
257	993	*010	*027	*044	*061	*078	*095̄	*111	*128	*145
258	41 162	179	196	212	229	246	263	280	296	313
259	330	347	363	380	397	414	430	447	464	481
260	497	514	531	547	564	581	597	614	631	647
261	664	681	697	714	731	747	764	780	797	814
262	830	847	863	880	896	913	929	946	963	979
263	996	*012	*029	*045	*062	*078	*095̄	*111	*127	*144
264	42 160	177	193	210	226	243	259	275	292	308
265	325̄	341	357	374	390	406	423	439	455	472
266	488	504	521	537	553	570	586	602	619	635̄
267	651	667	684	700	716	732	749	765̄	781	797
268	813	830	846	862	878	894	911	927	943	959
269	975	991	*008	*024	*040	*056	*072	*088	*104	*120
270	43 136	152	169	185̄	201	217	233	249	265̄	281
271	297	313	329	345̄	361	377	393	409	425̄	441
272	457	473	489	505̄	521	537	553	569	584	600
273	616	632	648	664	680	696	712	727	743	759
274	775	791	807	823	838	854	870	886	902	917
275	933	949	965̄	981	996	*012	*028	*044	*059	*075
276	44 091	107	122	138	154	170	185	201	217	232
277	248	264	279	295̄	311	326	342	358	373	389
278	404	420	436	451	467	483	498	514	529	545̄
279	560	576	592	607	623	638	654	669	685̄	700
280	716	731	747	762	778	793	809	824	840	855
281	871	886	902	917	932	948	963	979	994	*010
282	45 025̄	040	056	071	086	102	117	133	148	163
283	179	194	209	225̄	240	255	271	286	301	317
284	332	347	362	378	393	408	423	439	454	469
285	484	5̄00	515̄	530	545	561	576	591	606	621
286	637	652	667	682	697	712	728	743	758	773
287	788	803	818	834	849	864	879	894	909	924
288	939	954	969	984	*000	*015̄	*030	*045̄	*060	*075̄
289	46 090	105̄	120	135̄	15̄0	165̄	180	195̄	210	225̄
290	240	255̄	270	285̄	300	315̄	330	345̄	359	374
291	389	404	419	434	449	464	479	494	509	523
292	538	553	568	583	598	613	627	642	657	672
293	687	702	716	731	746	761	776	790	805	820
294	835̄	85̄0	864	879	894	909	923	938	953	967
295	982	997	*012	*026	*041	*056	*070	*085	*100	*114
296	47 129	144	159	173	188	202	217	232	246	261
297	276	290	305̄	319	334	349	363	378	392	407
298	422	436	451	465	480	494	509	524	538	553
299	567	582	596	611	625	640	654	669	683	698
300	712	727	741	756	770	784	799	813	828	842
N	L 0	1	2	3	4	5	6	7	8	9

P P

	18	17	16	15	14
1	1.8	1.7	1.6	1.5	1.4
2	3.6	3.4	3.2	3.0	2.8
3	5.4	5.1	4.8	4.5	4.2
4	7.2	6.8	6.4	6.0	5.6
5	9.0	8.5	8.0	7.5	7.0
6	10.8	10.2	9.6	9.0	8.4
7	12.6	11.9	11.2	10.5	9.8
8	14.4	13.6	12.8	12.0	11.2
9	16.2	15.3	14.4	13.5	12.6

P P

COMMON LOGARITHMS

300—350

N	L 0	1	2	3	4	5	6	7	8	9
300	47 712	727	741	756	770	784	799	813	828	842
301	857	871	885	900	914	929	943	958	972	986
302	48 001	015	029	044	058	073	087	101	116	130
303	144	159	173	187	202	216	230	244	259	273
304	287	302	316	330	344	359	373	387	401	416
305	430	444	458	473	487	501	515	530	544	558
306	572	586	601	615̄	629	643	657	671	686	700
307	714	728	742	756	770	785̄	799	813	827	841
308	855	869	883	897	911	926	940	954	968	982
309	996	*010	*024	*038	*052	*066	*080	*094	*108	*122
310	49 136	150	164	178	192	206	220	234	248	262
311	276	290	304	318	332	346	360	374	388	402
312	415	429	443	457	471	485	499	513	527	541
313	554	568	582	596	610	624	638	651	665	679
314	693	707	721	734	748	762	776	790	803	817
315	831	845̄	859	872	886	900	914	927	941	955̄
316	969	982	996	*010	*024	*037	*051	*065̄	*079	*092
317	50 106	120	133	147	161	174	188	202	215	229
318	243	256	270	284	297	311	325̄	338	352	365
319	379	393	406	420	433	447	461	474	488	501
320	515̄	529	542	556	569	583	596	610	623	637
321	651	664	678	691	705̄	718	732	745	759	772
322	786	799	813	826	840	853	866	880	893	907
323	920	934	947	961	974	987	*001	*014	*028	*041
324	51 055̄	068	081	095̄	108	121	135̄	148	162	175̄
325	188	202	215	228	242	255	268	282	295	308
326	322	335	348	362	375	388	402	415̄	428	441
327	455̄	468	481	495̄	508	521	534	548	561	574
328	587	601	614	627	640	654	667	680	693	706
329	720	733	746	759	772	786	799	812	825	838
330	851	865̄	878	891	904	917	930	943	957	970
331	983	996	*009	*022	*035	*048	*061	*075̄	*088	*101
332	52 114	127	140	153	166	179	192	205	218	231
333	244	257	270	284	297	310	323	336	349	362
334	375̄	388	401	414	427	440	453	466	479	492
335	504	517	530	543	556	569	582	595	608	621
336	634	647	660	673	686	699	711	724	737	750
337	763	776	789	802	815̄	827	840	853	866	879
338	892	905̄	917	930	943	956	969	982	994	*007
339	53 020	033	046	058	071	084	097	110	122	135
340	148	161	173	186	199	212	224	237	25̄0	263
341	275	288	301	314	326	339	352	364	377	390
342	403	415	428	441	453	466	479	491	504	517
343	529	542	555̄	567	580	593	605	618	631	643
344	656	668	681	694	706	719	732	744	757	769
345	782	794	807	820	832	845̄	857	870	882	895
346	908	920	933	945	958	970	983	995	*008	*020
347	54 033	045	058	070	083	095	108	120	133	145
348	158	170	183	195	208	220	233	245	258	270
349	283	295̄	307	320	332	345̄	357	370	382	394
350	407	419	432	444	456	469	481	494	506	518
N	L 0	1	2	3	4	5	6	7	8	9

P P

	15	14	13	12
1	1.5	1.4	1.3	1.2
2	3.0	2.8	2.6	2.4
3	4.5	4.2	3.9	3.6
4	6.0	5.6	5.2	4.8
5	7.5	7.0	6.5	6.0
6	9.0	8.4	7.8	7.2
7	10.5	9.8	9.1	8.4
8	12.0	11.2	10.4	9.6
9	13.5	12.6	11.7	10.8

P P

COMMON LOGARITHMS

350—400

N	L 0	1	2	3	4	5	6	7	8	9
350	54 407	419	432	444	456	469	481	494	506	518
351	531	543	555	568	580	593	605̄	617	630	642
352	654	667	679	691	704	716	728	741	753	765
353	777	790	802	814	827	839	851	864	876	888
354	900	913	925̄	937	949	962	974	986	998	*011
355	55 023	035	047	060	072	084	096	108	121	133
356	145̄	157	169	182	194	206	218	230	242	255̄
357	267	279	291	303	315	328	340	352	364	376
358	388	400	413	425̄	437	449	461	473	485	497
359	509	522	534	546	558	570	582	594	606	618
360	630	642	654	666	678	691	703	715̄	727	739
361	751	763	775̄	787	799	811	823	835̄	847	859
362	871	883	895̄	907	919	931	943	955̄	967	979
363	991	*003	*015̄	*027	*038	*050	*062	*074	*086	*098
364	56 110	122	134	146	158	170	182	194	205	217
365	229	241	253	265̄	277	289	301	312	324	336
366	348	360	372	384	396	407	419	431	443	455̄
367	467	478	490	502	514	526	538	549	561	573
368	585̄	597	608	620	632	644	656	667	679	691
369	703	714	726	738	75̄0	761	773	785̄	797	808
370	820	832	844	855	867	879	891	902	914	926
371	937	949	961	972	984	996	*008	*019	*031	*043
372	57 054	066	078	089	101	113	124	136	148	159
373	171	183	194	206	217	229	241	252	264	276
374	287	299	310	322	334	345	357	368	380	392
375	403	415̄	426	438	449	461	473	484	496	507
376	519	530	542	553	565̄	576	588	600	611	623
377	634	646	657	669	680	692	703	715̄	726	738
378	749	761	772	784	795	807	818	830	841	852
379	864	875	887	898	910	921	933	944	955	967
380	978	990	*001	*013	*024	*035	*047	*058	*070	*081
381	58 092	104	115	127	138	149	161	172	184	195̄
382	206	218	229	240	252	263	274	286	297	309
383	320	331	343	354	365	377	388	399	410	422
384	433	444	456	467	478	490	501	512	524	535̄
385	546	557	569	580	591	602	614	625̄	636	647
386	659	670	681	692	704	715̄	726	737	749	760
387	771	782	794	805̄	816	827	838	85̄0	861	872
388	883	894	906	917	928	939	950	961	973	984
389	995̄	*006	*017	*028	*040	*051	*062	*073	*084	*095
390	59 106	118	129	140	151	162	173	184	195	207
391	218	229	240	251	262	273	284	295	306	318
392	329	340	351	362	373	384	395	406	417	428
393	439	450	461	472	483	494	506	517	528	539
394	55̄0	561	572	583	594	605̄	616	627	638	649
395	660	671	682	693	704	715̄	726	737	748	759
396	770	780	791	802	813	824	835	846	857	868
397	879	890	901	912	923	934	945̄	956	966	977
398	988	999	*010	*021	*032	*043	*054	*065̄	*076	*086
399	60 097	108	119	130	141	152	163	173	184	195
400	206	217	228	239	249	260	271	282	293	304
N	L 0	1	2	3	4	5	6	7	8	9

P P

13	
1	1.3
2	2.6
3	3.9
4	5.2
5	6.5
6	7.8
7	9.1
8	10.4
9	11.7

12	
1	1.2
2	2.4
3	3.6
4	4.8
5	6.0
6	7.2
7	8.4
8	9.6
9	10.8

11	
1	1.1
2	2.2
3	3.3
4	4.4
5	5.5
6	6.6
7	7.7
8	8.8
9	9.9

10	
1	1.0
2	2.0
3	3.0
4	4.0
5	5.0
6	6.0
7	7.0
8	8.0
9	9.0

P P

COMMON LOGARITHMS

400—450

N	L 0	1	2	3	4	5	6	7	8	9	P P
400	60 206	217	228	239	249	260	271	282	293	304	
401	314	325	336	347	358	369	379	390	401	412	
402	423	433	444	455	466	477	487	498	509	520	
403	531	541	552	563	574	584	595	606	617	627	
404	638	649	660	670	681	692	703	713	724	73$\bar{5}$	
405	746	756	767	778	788	799	810	821	831	842	
406	853	863	874	88$\bar{5}$	895	906	917	927	938	949	11
407	959	970	981	991	*002	*013	*023	*034	*04$\bar{5}$	*055	1 1.1 2 2.2 3 3.3 4 4.4 5 5.5 6 6.6 7 7.7 8 8.8 9 9.9
408	61 066	077	087	098	109	119	130	140	151	162	
409	172	183	194	204	21$\bar{5}$	225	236	247	257	268	
410	278	289	300	310	321	331	342	352	363	374	
411	384	39$\bar{5}$	405	416	426	437	448	458	469	479	
412	490	500	511	521	532	542	553	563	574	584	
413	595	606	616	627	637	648	658	669	679	690	
414	700	711	721	731	742	752	763	773	784	794	
415	80$\bar{5}$	815	826	836	847	857	868	878	888	899	
416	909	920	930	941	951	962	972	982	993	*003	
417	62 014	024	034	04$\bar{5}$	055	066	076	086	097	107	
418	118	128	138	149	159	170	180	190	201	211	
419	221	232	242	252	263	273	284	294	304	31$\bar{5}$	
420	32$\bar{5}$	335	346	356	366	377	387	397	408	418	10
421	428	439	449	459	469	480	490	500	511	521	1 1.0 2 2.0 3 3.0 4 4.0 5 5.0 6 6.0 7 7.0 8 8.0 9 9.0
422	531	542	552	562	572	583	593	603	613	624	
423	634	644	65$\bar{5}$	66$\bar{5}$	675	685	696	706	716	726	
424	737	747	757	767	778	788	798	808	818	829	
425	839	849	859	870	880	890	900	910	921	931	
426	941	951	961	972	982	992	*002	*012	*022	*033	
427	63 043	053	063	073	083	094	104	114	124	134	
428	144	15$\bar{5}$	16$\bar{5}$	17$\bar{5}$	18$\bar{5}$	195	205	215	225	236	
429	246	256	266	276	286	296	306	317	327	337	
430	347	357	367	377	387	397	407	417	428	438	
431	448	458	468	478	488	498	508	518	528	538	
432	548	558	568	579	589	599	609	619	629	639	
433	649	659	669	679	689	699	709	719	729	739	
434	749	759	769	779	789	799	809	819	829	839	
435	849	859	869	879	889	899	909	919	929	939	
436	949	959	969	979	988	998	*008	*018	*028	*038	9
437	64 048	058	068	078	088	098	108	118	128	137	1 0.9 2 1.8 3 2.7 4 3.6 5 4.5 6 5.4 7 6.3 8 7.2 9 8.1
438	147	157	167	177	187	197	207	217	227	237	
439	246	256	266	276	286	296	306	316	326	335	
440	345	355	365	37$\bar{5}$	38$\bar{5}$	39$\bar{5}$	404	414	424	434	
441	444	454	464	473	483	493	503	513	523	532	
442	542	552	562	572	582	591	601	611	621	631	
443	640	650	660	670	680	689	699	709	719	729	
444	738	748	758	768	777	787	797	807	816	826	
445	836	846	856	865	875	88$\bar{5}$	89$\bar{5}$	904	914	924	
446	933	943	953	963	972	982	992	*002	*011	*021	
447	65 031	040	050	060	070	079	089	099	108	118	
448	128	137	147	157	167	176	186	196	205	21$\bar{5}$	
449	22$\bar{5}$	234	244	254	263	273	283	292	302	312	
450	321	331	341	350	360	369	379	389	398	408	
N	L 0	1	2	3	4	5	6	7	8	9	P P

COMMON LOGARITHMS

450—500

N	L 0	1	2	3	4	5	6	7	8	9
450	65 321	331	341	350	360	369	379	389	398	408
451	418	427	437	447	456	466	475	485	495̄	504
452	514	523	533	543	552	562	571	581	591	600
453	610	619	629	639	648	658	667	677	686	696
454	706	715	725̄	734	744	753	763	772	782	792
455	801	811	820	830	839	849	858	868	877	887
456	896	906	916	925	935̄	944	954	963	973	982
457	992	*001	*011	*020	*030	*039	*049	*058	*068	*077
458	66 087	096	106	115̄	124	134	143	153	162	172
459	181	191	200	210	219	229	238	247	257	266
460	276	285	295̄	304	314	323	332	342	351	361
461	370	380	389	398	408	417	427	436	445	455̄
462	464	474	483	492	502	511	521	530	539	549
463	558	567	577	586	596	605̄	614	624	633	642
464	652	661	671	680	689	699	708	717	727	736
465	745	755̄	764	773	783	792	801	811	820	829
466	839	848	857	867	876	885	894	904	913	922
467	932	941	950	960	969	978	987	997	*006	*015
468	67 025̄	034	043	052	062	071	080	089	099	108
469	117	127	136	145	154	164	173	182	191	201
470	210	219	228	237	247	256	265	274	284	293
471	302	311	321	330	339	348	357	367	376	385̄
472	394	403	413	422	431	440	449	459	468	477
473	486	495	504	514	523	532	541	550	560	569
474	578	587	596	605	614	624	633	642	651	660
475	669	679	688	697	706	715	724	733	742	752
476	761	770	779	788	797	806	815	825̄	834	843
477	852	861	870	879	888	897	906	916	925̄	934
478	943	952	961	970	979	988	997	*006	*015	*024
479	68 034	043	052	061	070	079	088	097	106	115
480	124	133	142	151	160	169	178	187	196	205
481	215̄	224	233	242	251	260	269	278	287	296
482	305̄	314	323	332	341	350	359	368	377	386
483	395̄	404	413	422	431	440	449	458	467	476
484	485̄	494	502	511	520	529	538	547	556	565
485	574	583	592	601	610	619	628	637	646	655̄
486	664	673	681	690	699	708	717	726	735	744
487	753	762	771	780	789	797	806	815	824	833
488	842	851	860	869	878	886	895	904	913	922
489	931	940	949	958	966	975	984	993	*002	*011
490	69 020	028	037	046	055	064	073	082	090	099
491	108	117	126	135̄	144	152	161	170	179	188
492	197	205	214	223	232	241	249	258	267	276
493	285̄	294	302	311	320	329	338	346	355	364
494	373	381	390	399	408	417	425	434	443	452
495	461	469	478	487	496	504	513	522	531	539
496	548	557	566	574	583	592	601	609	618	627
497	636	644	653	662	671	679	688	697	705	714
498	723	732	740	749	758	767	775	784	793	801
499	810	819	827	836	845̄	854	862	871	880	888
500	897	906	914	923	932	940	949	958	966	975
N	L 0	1	2	3	4	5	6	7	8	9

P P

	10
1	1.0
2	2.0
3	3.0
4	4.0
5	5.0
6	6.0
7	7.0
8	8.0
9	9.0

	9
1	0.9
2	1.8
3	2.7
4	3.6
5	4.5
6	5.4
7	6.3
8	7.2
9	8.1

	8
1	0.8
2	1.6
3	2.4
4	3.2
5	4.0
6	4.8
7	5.6
8	6.4
9	7.2

P P

COMMON LOGARITHMS

500—550

N	L 0	1	2	3	4	5	6	7	8	9
500	69 897	906	914	923	932	940	949	958	966	975
501	984	992	*001	*010	*018	*027	*036	*044	*053	*062
502	70 070	079	088	096	105̄	114	122	131	140	148
503	157	165	174	183	191	200	209	217	226	234
504	243	252	260	269	278	286	295̄	303	312	321
505	329	338	346	355̄	364	372	381	389	398	406
506	415	424	432	441	449	458	467	475	484	492
507	501	509	518	526	535	544	552	561	569	578
508	586	595̄	603	612	621	629	638	646	655̄	663
509	672	680	689	697	706	714	723	731	740	749
510	757	766	774	783	791	800	808	817	825	834
511	842	851	859	868	876	885̄	893	902	910	919
512	927	935	944	952	961	969	978	986	995̄	*003
513	71 012	020	029	037	046	054	063	071	079	088
514	096	105̄	113	122	130	139	147	155	164	172
515	181	189	198	206	214	223	231	240	248	257
516	265̄	273	282	290	299	307	315	324	332	341
517	349	357	366	374	383	391	399	408	416	425̄
518	433	441	45̄0	458	466	475̄	483	492	5̄00	508
519	517	525	533	542	550	559	567	575	584	592
520	600	609	617	625	634	642	650	659	667	675
521	684	692	700	709	717	725	734	742	750	759
522	767	775	784	792	800	809	817	825	834	842
523	850	858	867	875	883	892	900	908	917	925̄
524	933	941	95̄0	958	966	975̄	983	991	999	*008
525	72 016	024	032	041	049	057	066	074	082	090
526	099	107	115	123	132	140	148	156	165̄	173
527	181	189	198	206	214	222	230	239	247	255
528	263	272	280	288	296	304	313	321	329	337
529	346	354	362	370	378	387	395̄	403	411	419
530	428	436	444	452	460	469	477	485̄	493	501
531	509	518	526	534	542	550	558	567	575̄	583
532	591	599	607	616	624	632	640	648	656	665̄
533	673	681	689	697	705	713	722	730	738	746
534	754	762	770	779	787	795̄	803	811	819	827
535	835	843	852	860	868	876	884	892	900	908
536	916	925̄	933	941	949	957	965	973	981	989
537	997	*006	*014	*022	*030	*038	*046	*054	*062	*070
538	73 078	086	094	102	111	119	127	135̄	143	151
539	159	167	175̄	183	191	199	207	215	223	231
540	239	247	255	263	272	280	288	296	304	312
541	320	328	336	344	352	360	368	376	384	392
542	400	408	416	424	432	440	448	456	464	472
543	480	488	496	504	512	520	528	536	544	552
544	560	568	576	584	592	600	608	616	624	632
545	640	648	656	664	672	679	687	695	703	711
546	719	727	735	743	751	759	767	775̄	783	791
547	799	807	815̄	823	830	838	846	854	862	870
548	878	886	894	902	910	918	926	933	941	949
549	957	965	973	981	989	997	*005̄	*013	*020	*028
550	74 036	044	052	060	068	076	084	092	099	107
N	L 0	1	2	3	4	5	6	7	8	9

P P

	9
1	0.9
2	1.8
3	2.7
4	3.6
5	4.5
6	5.4
7	6.3
8	7.2
9	8.1

	8
1	0.8
2	1.6
3	2.4
4	3.2
5	4.0
6	4.8
7	5.6
8	6.4
9	7.2

	7
1	0.7
2	1.4
3	2.1
4	2.8
5	3.5
6	4.2
7	4.9
8	5.6
9	6.3

P P

COMMON LOGARITHMS

550—600

N	L 0	1	2	3	4	5	6	7	8	9	P P
550	74 036	044	052	060	068	076	084	092	099	107	
551	115	123	131	139	147	155̄	162	170	178	186	
552	194	202	210	218	225	233	241	249	257	265̄	
553	273	280	288	296	304	312	320	327	335	343	
554	351	359	367	374	382	390	398	406	414	421	
555	429	437	445̄	453	461	468	476	484	492	5̄00	
556	507	515	523	531	539	547	554	562	570	578	
557	586	593	601	609	617	624	632	640	648	656	
558	663	671	679	687	695̄	702	710	718	726	733	
559	741	749	757	764	772	780	788	796	803	811	
560	819	827	834	842	85̄0	858	865	873	881	889	
561	896	904	912	920	927	935̄	943	950	958	966	8
562	974	981	989	997	*005̄	*012	*020	*028	*035	*043	1 0.8
563	75 051	059	066	074	082	089	097	105̄	113	120	2 1.6
564	128	136	143	151	159	166	174	182	189	197	3 2.4
565	205̄	213	220	228	236	243	251	259	266	274	4 3.2
566	282	289	297	305̄	312	320	328	335	343	351	5 4.0
567	358	366	374	381	389	397	404	412	420	427	6 4.8
568	435̄	442	450	458	465	473	481	488	496	504	7 5.6
569	511	519	526	534	542	549	557	565̄	572	580	8 6.4
570	587	595	603	610	618	626	633	641	648	656	9 7.2
571	664	671	679	686	694	702	709	717	724	732	
572	740	747	755̄	762	770	778	785	793	800	808	
573	815	823	831	838	846	853	861	868	876	884	
574	891	899	906	914	921	929	937	944	952	959	
575	967	974	982	989	997	*005̄	*012	*020	*027	*035̄	
576	76 042	05̄0	057	065̄	072	080	087	095̄	103	110	
577	118	125	133	140	148	155	163	170	178	185	
578	193	200	208	215	223	230	238	245	253	260	
579	268	275	283	290	298	305	313	320	328	335	
580	343	350	358	365	373	380	388	395	403	410	
581	418	425	433	440	448	455̄	462	470	477	485̄	7
582	492	5̄00	507	515̄	522	530	537	545̄	552	559	1 0.7
583	567	574	582	589	597	604	612	619	626	634	2 1.4
584	641	649	656	664	671	678	686	693	701	708	3 2.1
585	716	723	730	738	745	753	760	768	775̄	782	4 2.8
586	790	797	805̄	812	819	827	834	842	849	856	5 3.5
587	864	871	879	886	893	901	908	916	923	930	6 4.2
588	938	945	953	960	967	975̄	982	989	997	*004	7 4.9
589	77 012	019	026	034	041	048	056	063	070	078	8 5.6
590	085	093	100	107	115̄	122	129	137	144	151	9 6.3
591	159	166	173	181	188	195	203	210	217	225̄	
592	232	240	247	254	262	269	276	283	291	298	
593	305	313	320	327	335̄	342	349	357	364	371	
594	379	386	393	401	408	415	422	430	437	444	
595	452	459	466	474	481	488	495	503	510	517	
596	525̄	532	539	546	554	561	568	576	583	590	
597	597	605̄	612	619	627	634	641	648	656	663	
598	670	677	685̄	692	699	706	714	721	728	735	
599	743	75̄0	757	764	772	779	786	793	801	808	
600	815	822	830	837	844	851	859	866	873	880	
N	L 0	1	2	3	4	5	6	7	8	9	P P

COMMON LOGARITHMS

600—650

N	L 0	1	2	3	4	5	6	7	8	9
600	77 815	822	830	837	844	851	859	866	873	880
601	887	895̄	902	909	916	924	931	938	945	952
602	960	967	974	981	988	996	*003	*010	*017	*025̄
603	78 032	039	046	053	061	068	075̄	082	089	097
604	104	111	118	125	132	140	147	154	161	168
605	176	183	190	197	204	211	219	226	233	240
606	247	254	262	269	276	283	290	297	305̄	312
607	319	326	333	340	347	355̄	362	369	376	383
608	390	398	405̄	412	419	426	433	440	447	455̄
609	462	469	476	483	490	497	504	512	519	526
610	533	540	547	554	561	569	576	583	590	597
611	604	611	618	625	633	640	647	654	661	668
612	675	682	689	696	704	711	718	725̄	732	739
613	746	753	760	767	774	781	789	796	803	810
614	817	824	831	838	845	852	859	866	873	880
615	888	895̄	902	909	916	923	930	937	944	951
616	958	965	972	979	986	993	*000	*007	*014	*021
617	79 029	036	043	050	057	064	071	078	085̄	092
618	099	106	113	120	127	134	141	148	155	162
619	169	176	183	190	197	204	211	218	225	232
620	239	246	253	260	267	274	281	288	295	302
621	309	316	323	330	337	344	351	358	365	372
622	379	386	393	400	407	414	421	428	435̄	442
623	449	456	463	470	477	484	491	498	505̄	511
624	518	525	532	539	546	553	560	567	574	581
625	588	595̄	602	609	616	623	630	637	644	650
626	657	664	671	678	685	692	699	706	713	720
627	727	734	741	748	754	761	768	775	782	789
628	796	803	810	817	824	831	837	844	851	858
629	865	872	879	886	893	900	906	913	920	927
630	934	941	948	955̄	962	969	975	982	989	996
631	80 003	010	017	024	030	037	044	051	058	065̄
632	072	079	085	092	099	106	113	120	127	134
633	140	147	154	161	168	175̄	182	188	195	202
634	209	216	223	229	236	243	250	257	264	271
635	277	284	291	298	305̄	312	318	325	332	339
636	346	353	359	366	373	380	387	393	400	407
637	414	421	428	434	441	448	455̄	462	468	475
638	482	489	496	502	509	516	523	530	536	543
639	550	557	564	570	577	584	591	598	604	611
640	618	625̄	632	638	645	652	659	665	672	679
641	686	693	699	706	713	720	726	733	740	747
642	754	760	767	774	781	787	794	801	808	814
643	821	828	835̄	841	848	855̄	862	868	875	882
644	889	895	902	909	916	922	929	936	943	949
645	956	963	969	976	983	990	996	*003	*010	*017
646	81 023	030	037	043	050	057	064	070	077	084
647	090	097	104	111	117	124	131	137	144	151
648	158	164	171	178	184	191	198	204	211	218
649	224	231	238	245̄	251	258	265̄	271	278	285̄
650	291	298	305̄	311	318	325̄	331	338	345̄	351
N	L 0	1	2	3	4	5	6	7	8	9

P P

	8
1	0.8
2	1.6
3	2.4
4	3.2
5	4.0
6	4.8
7	5.6
8	6.4
9	7.2

	7
1	0.7
2	1.4
3	2.1
4	2.8
5	3.5
6	4.2
7	4.9
8	5.6
9	6.3

	6
1	0.6
2	1.2
3	1.8
4	2.4
5	3.0
6	3.6
7	4.2
8	4.8
9	5.4

P P

COMMON LOGARITHMS

650—700

N	L 0	1	2	3	4	5	6	7	8	9	P P
650	81 291	298	305̄	311	318	325̄	331	338	345	351	
651	358	365̄	371	378	385̄	391	398	405̄	411	418	
652	425̄	431	438	445̄	451	458	465̄	471	478	485̄	
653	491	498	505̄	511	518	525̄	531	538	544	551	
654	558	564	571	578	584	591	598	604	611	617	
655	624	631	637	644	651	657	664	671	677	684	
656	690	697	704	710	717	723	730	737	743	75̄0	
657	757	763	770	776	783	790	796	803	809	816	
658	823	829	836	842	849	856	862	869	875	882	
659	889	895	902	908	915̄	921	928	935̄	941	948	
660	954	961	968	974	981	987	994	*000	*007	*014	
661	82 020	027	033	040	046	053	060	066	073	079	
662	086	092	099	105	112	119	125	132	138	145̄	7
663	151	158	164	171	178	184	191	197	204	210	1 0.7
664	217	223	230	236	243	249	256	263	269	276	2 1.4
665	282	289	295	302	308	315̄	321	328	334	341	3 2.1
666	347	354	360	367	373	380	387	393	400	406	4 2.8
667	413	419	426	432	439	445	452	458	465̄	471	5 3.5
668	478	484	491	497	504	510	517	523	530	536	6 4.2
669	543	549	556	562	569	575	582	588	595̄	601	7 4.9
670	607	614	620	627	633	640	646	653	659	666	8 5.6
671	672	679	685	692	698	705̄	711	718	724	730	9 6.3
672	737	743	75̄0	756	763	769	776	782	789	795	
673	802	808	814	821	827	834	840	847	853	860	
674	866	872	879	885	892	898	905̄	911	918	924	
675	930	937	943	95̄0	956	963̄	969	975	982	988	
676	995̄	*001	*008	*014	*020	*027	*033	*040	*046	*052	
677	83 059	065	072	078	085̄	091	097	104	110	117	
678	123	129	136	142	149	155̄	161	168	174	181	
679	187	193	200	206	213	219	225	232	238	245̄	
680	251	257	264	270	276	283	289	296	302	308	
681	315̄	321	327	334	340	347	353	359	366	372	6
682	378	385̄	391	398	404	410	417	423	429	436	1 0.6
683	442	448	455̄	461	467	474	480	487	493	499	2 1.2
684	506	512	518	525̄	531	537	544	550	556	563	3 1.8
685	569	575	582	588	594	601	607	613	620	626	4 2.4
686	632	639	645	651	658	664	670	677	683	689	5 3.0
687	696	702	708	715̄	721	727	734	740	746	753	6 3.6
688	759	765	771	778	784	790	797	803	809	816	7 4.2
689	822	828	835̄	841	847	853	860	866	872	879	8 4.8
690	885̄	891	897	904	910	916	923	929	935	942	9 5.4
691	948	954	960	967	973	979	985	992	998	*004	
692	84 011	017	023	029	036	042	048	055̄	061	067	
693	073	080	086	092	098	105̄	111	117	123	130	
694	136	142	148	155̄	161	167	173	180	186	192	
695	198	205̄	211	217	223	230	236	242	248	255̄	
696	261	267	273	280	286	292	298	305̄	311	317	
697	323	330	336	342	348	354	361	367	373	379	
698	386	392	398	404	410	417	423	429	435	442	
699	448	454	460	466	473	479	485̄	491	497	504	
700	510	516	522	528	535̄	541	547	553	559	566	
N	L 0	1	2	3	4	5	6	7	8	9	P P

COMMON LOGARITHMS

700—750

N	L 0	1	2	3	4	5	6	7	8	9
700	84 510	516	522	528	535̄	541	547	553	559	566
701	572	578	584	590	597	603	609	615	621	628
702	634	640	646	652	658	665̄	671	677	683	689
703	696	702	708	714	720	726	733	739	745̄	751
704	757	763	770	776	782	788	794	800	807	813
705	819	825	831	837	844	85̄0	856	862	868	874
706	880	887	893	899	905	911	917	924	930	936
707	942	948	954	960	967	973	979	985̄	991	997
708	85 003	009	016	022	028	034	040	046	052	058
709	065̄	071	077	083	089	095	101	107	114	120
710	126	132	138	144	150	156	163	169	175̄	181
711	187	193	199	205	211	217	224	230	236	242
712	248	254	260	266	272	278	285̄	291	297	303
713	309	315	321	327	333	339	345	352	358	364
714	370	376	382	388	394	400	406	412	418	425̄
715	431	437	443	449	455̄	461	467	473	479	485
716	491	497	503	509	516	522	528	534	540	546
717	552	558	564	570	576	582	588	594	600	606
718	612	618	625̄	631	637	643	649	655̄	661	667
719	673	679	685̄	691	697	703	709	715	721	727
720	733	739	745	751	757	763	769	775	781	788
721	794	800	806	812	818	824	830	836	842	848
722	854	860	866	872	878	884	890	896	902	908
723	914	920	926	932	938	944	95̄0	956	962	968
724	974	980	986	992	998	*004	*010	*016	*022	*028
725	86 034	040	046	052	058	064	070	076	082	088
726	094	100	106	112	118	124	130	136	141	147
727	153	159	165	171	177	183	189	195	201	207
728	213	219	225	231	237	243	249	255̄	261	267
729	273	279	285̄	291	297	303	308	314	320	326
730	332	338	344	350	356	362	368	374	380	386
731	392	398	404	410	415	421	427	433	439	445
732	451	457	463	469	475̄	481	487	493	499	504
733	510	516	522	528	534	540	546	552	558	564
734	570	576	581	587	593	599	605	611	617	623
735	629	635̄	641	646	652	658	664	670	676	682
736	688	694	700	705	711	717	723	729	735̄	741
737	747	753	759	764	770	776	782	788	794	800
738	806	812	817	823	829	835	841	847	853	859
739	864	870	876	882	888	894	900	906	911	917
740	923	929	935̄	941	947	953	958	964	970	976
741	982	988	994	999	*005	*011	*017	*023	*029	*035̄
742	87 040	046	052	058	064	070	075	081	087	093
743	099	105̄	111	116	122	128	134	140	146	151
744	157	163	169	175̄	181	186	192	198	204	210
745	216	221	227	233	239	245̄	251	256	262	268
746	274	280	286	291	297	303	309	315̄	320	326
747	332	338	344	349	355	361	367	373	379	384
748	390	396	402	408	413	419	425̄	431	437	442
749	448	454	460	466	471	477	483	489	495̄	500
750	506	512	518	523	529	535	541	547	552	558
N	L 0	1	2	3	4	5	6	7	8	9

P P

	7
1	0.7
2	1.4
3	2.1
4	2.8
5	3.5
6	4.2
7	4.9
8	5.6
9	6.3

	6
1	0.6
2	1.2
3	1.8
4	2.4
5	3.0
6	3.6
7	4.2
8	4.8
9	5.4

	5
1	0.5
2	1.0
3	1.5
4	2.0
5	2.5
6	3.0
7	3.5
8	4.0
9	4.5

P P

COMMON LOGARITHMS

750—800

N	L 0	1	2	3	4	5	6	7	8	9
750	87 506	512	518	523	529	535	541	547	552	558
751	564	570	576	581	587	593	599	604	610	616
752	622	628	633	639	64$\bar{5}$	651	656	662	668	674
753	679	685	691	697	703	708	714	720	726	731
754	737	743	749	754	760	766	772	777	783	789
755	79$\bar{5}$	800	806	812	818	823	829	83$\bar{5}$	841	846
756	852	858	864	869	875	881	887	892	898	904
757	910	915	921	927	933	938	944	9$\bar{5}$0	955	961
758	967	973	978	984	990	996	*001	*007	*013	*018
759	88 024	030	036	041	047	053	058	064	070	076
760	081	087	093	098	104	110	116	121	127	133
761	138	144	1$\bar{5}$0	156	161	167	173	178	184	190
762	195	201	207	213	218	224	230	235	241	247
763	252	258	264	270	275	281	287	292	298	304
764	309	315	321	326	332	338	343	349	35$\bar{5}$	360
765	366	372	377	383	389	39$\bar{5}$	400	406	412	417
766	423	429	434	440	446	451	457	463	468	474
767	480	485	491	497	502	508	513	519	52$\bar{5}$	530
768	536	542	547	553	559	564	570	576	581	587
769	593	598	604	610	615	621	627	632	638	643
770	649	65$\bar{5}$	660	666	672	677	683	689	694	700
771	705	711	717	722	728	734	739	74$\bar{5}$	750	756
772	762	767	773	779	784	790	795	801	807	812
773	818	824	829	83$\bar{5}$	840	846	852	857	863	868
774	874	880	885	891	897	902	908	913	919	92$\bar{5}$
775	930	936	941	947	953	958	964	969	97$\bar{5}$	981
776	986	992	997	*003	*009	*014	*020	*025	*031	*037
777	89 042	048	053	059	064	070	076	081	087	092
778	098	104	109	11$\bar{5}$	120	126	131	137	143	148
779	154	159	16$\bar{5}$	170	176	182	187	193	198	204
780	209	215	221	226	232	237	243	248	254	260
781	265	271	276	282	287	293	298	304	310	315
782	321	326	332	337	343	348	354	360	365	371
783	376	382	387	393	398	404	409	41$\bar{5}$	421	426
784	432	437	443	448	454	459	46$\bar{5}$	470	476	481
785	487	492	498	504	509	51$\bar{5}$	520	526	531	537
786	542	548	553	559	564	570	575	581	586	592
787	597	603	609	614	620	625	631	636	642	647
788	653	658	664	669	67$\bar{5}$	680	686	691	697	702
789	708	713	719	724	730	735	741	746	752	757
790	763	768	774	779	78$\bar{5}$	790	796	801	807	812
791	818	823	829	834	840	845	851	856	862	867
792	873	878	883	889	894	900	905	911	916	922
793	927	933	938	944	949	95$\bar{5}$	960	966	971	977
794	982	988	993	998	*004	*009	*01$\bar{5}$	*020	*026	*031
795	90 037	042	048	053	059	064	069	07$\bar{5}$	080	086
796	091	097	102	108	113	119	124	129	13$\bar{5}$	140
797	146	151	157	162	168	173	179	184	189	19$\bar{5}$
798	200	206	211	217	222	227	233	238	244	249
799	25$\bar{5}$	260	266	271	276	282	287	293	298	304
800	309	314	320	325	331	336	342	347	352	358
N	L 0	1	2	3	4	5	6	7	8	9

P P

	6
1	0.6
2	1.2
3	1.8
4	2.4
5	3.0
6	3.6
7	4.2
8	4.8
9	5.4

	5
1	0.5
2	1.0
3	1.5
4	2.0
5	2.5
6	3.0
7	3.5
8	4.0
9	4.5

P P

COMMON LOGARITHMS

800—850

N	L 0	1	2	3	4	5	6	7	8	9	P P
800	90 309	314	320	325	331	336	342	347	352	358	
801	363	369	374	380	385̄	390	396	401	407	412	
802	417	423	428	434	439	445̄	45̄0	455	461	466	
803	472	477	482	488	493	499	504	509	515̄	520	
804	526	531	536	542	547	553	558	563	569	574	
805	580	585̄	590	596	601	607	612	617	623	628	
806	634	639	644	65̄0	655	660	666	671	677	682	
807	687	693	698	703	709	714	720	725	730	736	
808	741	747	752	757	763	768	773	779	784	789	
809	795̄	800	806	811	816	822	827	832	838	843	
810	849	854	859	865̄	870	875	881	886	891	897	
811	902	907	913	918	924	929	934	940	945̄	950	6
812	956	961	966	972	977	982	988	993	998	*004	1 0.6
813	91 009	014	020	025	030	036	041	046	052	057	2 1.2
814	062	068	073	078	084	089	094	100	105	110	3 1.8
815	116	121	126	132	137	142	148	153	158	164	4 2.4
816	169	174	180	185̄	190	196	201	206	212	217	5 3.0
817	222	228	233	238	243	249	254	259	265̄	270	6 3.6
818	275	281	286	291	297	302	307	312	318	323	7 4.2
819	328	334	339	344	35̄0	355̄	360	365	371	376	8 4.8
820	381	387	392	397	403	408	413	418	424	429	9 5.4
821	434	440	445̄	450	455	461	466	471	477	482	
822	487	492	498	503	508	514	519	524	529	535̄	
823	540	545	551	556	561	566	572	577	582	587	
824	593	598	603	609	614	619	624	630	635̄	640	
825	645	651	656	661	666	672	677	682	687	693	
826	698	703	709	714	719	724	730	735̄	740	745	
827	751	756	761	766	772	777	782	787	793	798	
828	803	808	814	819	824	829	834	840	845̄	850	
829	855	861	866	871	876	882	887	892	897	903	
830	908	913	918	924	929	934	939	944	950	955̄	
831	960	965	971	976	981	986	991	997	*002	*007	5
832	92 012	018	023	028	033	038	044	049	054	059	1 0.5
833	065̄	070	075̄	080	085	091	096	101	106	111	2 1.0
834	117	122	127	132	137	143	148	153	158	163	3 1.5
835	169	174	179	184	189	195̄	200	205	210	215	4 2.0
836	221	226	231	236	241	247	252	257	262	267	5 2.5
837	273	278	283	288	293	298	304	309	314	319	6 3.0
838	324	330	335̄	340	345	350	355	361	366	371	7 3.5
839	376	381	387	392	397	402	407	412	418	423	8 4.0
840	428	433	438	443	449	454	459	464	469	474	9 4.5
841	480	485̄	490	495	500	505	511	516	521	526	
842	531	536	542	547	552	557	562	567	572	578	
843	583	588	593	598	603	609	614	619	624	629	
844	634	639	645̄	65̄0	655̄	660	665	670	675	681	
845	686	691	696	701	706	711	716	722	727	732	
846	737	742	747	752	758	763	768	773	778	783	
847	788	793	799	804	809	814	819	824	829	834	
848	840	845̄	85̄0	855̄	860	865	870	875	881	886	
849	891	896	901	906	911	916	921	927	932	937	
850	942	947	952	957	962	967	973	978	983	988	
N	L 0	1	2	3	4	5	6	7	8	9	P P

COMMON LOGARITHMS

850—900

N	L 0	1	2	3	4	5	6	7	8	9	P P
850	92 942	947	952	957	962	967	973	978	983	988	
851	993	998	*003	*008	*013	*018	*024	*029	*034	*039	
852	93 044	049	054	059	064	069	075̄	080	085̄	090	
853	095̄	100	105	110	115	120	125	131	136	141	
854	146	151	156	161	166	171	176	181	186	192	
855	197	202	207	212	217	222	227	232	237	242	
856	247	252	258	263	268	273	278	283	288	293	
857	298	303	308	313	318	323	328	334	339	344	**6**
858	349	354	359	364	369	374	379	384	389	394	1 | 0.6
859	399	404	409	414	420	425̄	430	435̄	440	445̄	2 | 1.2
860	450	455̄	460	465̄	470	475	480	485	490	495	3 | 1.8
861	500	505	510	515	520	526	531	536	541	546	4 | 2.4
862	551	556	561	566	571	576	581	586	591	596	5 | 3.0
863	601	606	611	616	621	626	631	636	641	646	6 | 3.6
864	651	656	661	666	671	676	682	687	692	697	7 | 4.2
865	702	707	712	717	722	727	732	737	742	747	8 | 4.8
866	752	757	762	767	772	777	782	787	792	797	9 | 5.4
867	802	807	812	817	822	827	832	837	842	847	
868	852	857	862	867	872	877	882	887	892	897	
869	902	907	912	917	922	927	932	937	942	947	
870	952	957	962	967	972	977	982	987	992	997	
871	94 002	007	012	017	022	027	032	037	042	047	**5**
872	052	057	062	067	072	077	082	086	091	096	1 | 0.5
873	101	106	111	116	121	126	131	136	141	146	2 | 1.0
874	151	156	161	166	171	176	181	186	191	196	3 | 1.5
875	201	206	211	216	221	226	231	236	240	245	4 | 2.0
876	250	255	260	265	270	275	280	285	290	295	5 | 2.5
877	300	305̄	310	315̄	320	325̄	330	335̄	340	345̄	6 | 3.0
878	349	354	359	364	369	374	379	384	389	394	7 | 3.5
879	399	404	409	414	419	424	429	433	438	443	8 | 4.0
880	448	453	458	463	468	473	478	483	488	493	9 | 4.5
881	498	503	507	512	517	522	527	532	537	542	
882	547	552	557	562	567	571	576	581	586	591	
883	596	601	606	611	616	621	626	630	635	640	
884	645	650	655	660	665̄	670	675̄	680	685̄	689	
885	694	699	704	709	714	719	724	729	734	738	
886	743	748	753	758	763	768	773	778	783	787	
887	792	797	802	807	812	817	822	827	832	836	**4**
888	841	846	851	856	861	866	871	876	880	885	1 | 0.4
889	890	895	900	905̄	910	915̄	919	924	929	934	2 | 0.8
890	939	944	949	954	959	963	968	973	978	983	3 | 1.2
891	988	993	998	*002	*007	*012	*017	*022	*027	*032	4 | 1.6
892	95 036	041	046	051	056	061	066	071	075	080	5 | 2.0
893	085	090	095̄	100	105̄	109	114	119	124	129	6 | 2.4
894	134	139	143	148	153	158	163	168	173	177	7 | 2.8
895	182	187	192	197	202	207	211	216	221	226	8 | 3.2
896	231	236	240	245	250	255	260	265̄	270	274	9 | 3.6
897	279	284	289	294	299	303	308	313	318	323	
898	328	332	337	342	347	352	357	361	366	371	
899	376	381	386	390	395	400	405̄	410	415̄	419	
900	424	429	434	439	444	448	453	458	463	468	
N	L 0	1	2	3	4	5	6	7	8	9	P P

COMMON LOGARITHMS

900—950

N	L 0	1	2	3	4	5	6	7	8	9	P P
900	95 424	429	434	439	444	448	453	458	463	468	
901	472	477	482	487	492	497	501	506	511	516	
902	521	525	530	535	540	545̄	55̄0	554	559	564	
903	569	574	578	583	588	593	598	602	607	612	
904	617	622	626	631	636	641	646	650	655	660	
905	665̄	670	674	679	684	689	694	698	703	708	
906	713	718	722	727	732	737	742	746	751	756	
907	761	766	770	775	780	785̄	789	794	799	804	
908	809	813	818	823	828	832	837	842	847	852	
909	856	861	866	871	875	880	885	890	895̄	899	
910	904	909	914	918	923	928	933	938	942	947	
911	952	957	961	966	971	976	980	985	990	995̄	
912	999	*004	*009	*014	*019	*023	*028	*033	*038	*042	**5**
913	96 047	052	057	061	066	071	076	080	085	090	1 0.5
914	095̄	099	104	109	114	118	123	128	133	137	2 1.0
915	142	147	152	156	161	166	171	175	180	185̄	3 1.5
916	190	194	199	204	209	213	218	223	227	232	4 2.0
917	237	242	246	251	256	261	265	270	275̄	280	5 2.5
918	284	289	294	298	303	308	313	317	322	327	6 3.0
919	332	336	341	346	350	355	360	365̄	369	374	7 3.5
920	379	384	388	393	398	402	407	412	417	421	8 4.0
921	426	431	435	440	445̄	45̄0	454	459	464	468	9 4.5
922	473	478	483	487	492	497	501	506	511	515	
923	520	525̄	530	534	539	544	548	553	558	562	
924	567	572	577	581	586	591	595	600	605̄	609	
925	614	619	624	628	633	638	642	647	652	656	
926	661	666	670	675	680	685̄	689	694	699	703	
927	708	713	717	722	727	731	736	741	745	750	
928	755̄	759	764	769	774	778	783	788	792	797	
929	802	806	811	816	820	825̄	830	834	839	844	
930	848	853	858	862	867	872	876	881	886	890	
931	895̄	900	904	909	914	918	923	928	932	937	**4**
932	942	946	951	956	960	965̄	970	974	979	984	1 0.4
933	988	993	997	*002	*007	*011	*016	*021	*025	*030	2 0.8
934	97 035̄	039	044	049	053	058	063	067	072	077	3 1.2
935	081	086	090	095	100	104	109	114	118	123	4 1.6
936	128	132	137	142	146	151	155	160	165̄	169	5 2.0
937	174	179	183	188	192	197	202	206	211	216	6 2.4
938	220	225̄	230	234	239	243	248	253	257	262	7 2.8
939	267	271	276	280	285	290	294	299	304	308	8 3.2
940	313	317	322	327	331	336	340	345	35̄0	354	9 3.6
941	359	364	368	373	377	382	387	391	396	400	
942	405	410	414	419	424	428	433	437	442	447	
943	451	456	460	465̄	470	474	479	483	488	493	
944	497	502	506	511	516	520	525̄	529	534	539	
945	543	548	552	557	562	566	571	575	580	585̄	
946	589	594	598	603	607	612	617	621	626	630	
947	635̄	640	644	649	653	658	663	667	672	676	
948	681	685	690	695̄	699	704	708	713	717	722	
949	727	731	736	740	745̄	749	754	759	763	768	
950	772	777	782	786	791	795	800	804	809	813	
N	L 0	1	2	3	4	5	6	7	8	9	P P

COMMON LOGARITHMS

950—1000

N	L 0	1	2	3	4	5	6	7	8	9
950	97 772	777	782	786	791	795	800	804	809	813
951	818	823	827	832	836	841	845	850	855̄	859
952	864	868	873	877	882	886	891	896	900	905̄
953	909	914	918	923	928	932	937	941	946	950
954	955̄	959	964	968	973	978	982	987	991	996
955	98 000	005̄	009	014	019	023	028	032	037	041
956	046	050	055̄	059	064	068	073	078	082	087
957	091	096	100	105̄	109	114	118	123	127	132
958	137	141	146	150	155̄	159	164	168	173	177
959	182	186	191	195	200	204	209	214	218	223
960	227	232	236	241	245	250	254	259	263	268
961	272	277	281	286	290	295̄	299	304	308	313
962	318	322	327	331	336	340	345̄	349	354	358
963	363	367	372	376	381	385	390	394	399	403
964	408	412	417	421	426	430	435̄	439	444	448
965	453	457	462	466	471	475	480	484	489	493
966	498	502	507	511	516	520	525̄	529	534	538
967	543	547	552	556	561	565	570	574	579	583
968	588	592	597	601	605	610	614	619	623	628
969	632	637	641	646	650	655̄	659	664	668	673
970	677	682	686	691	695	700	704	709	713	717
971	722	726	731	735	740	744	749	753	758	762
972	767	771	776	780	784	789	793	798	802	807
973	811	816	820	825̄	829	834	838	843	847	851
974	856	860	865̄	869	874	878	883	887	892	896
975	900	905̄	909	914	918	923	927	932	936	941
976	945̄	949	954	958	963	967	972	976	981	985
977	989	994	998	*003	*007	*012	*016	*021	*025	*029
978	99 034	038	043	047	052	056	061	065̄	069	074
979	078	083	087	092	096	100	105̄	109	114	118
980	123	127	131	136	140	145̄	149	154	158	162
981	167	171	176	180	185̄	189	193	198	202	207
982	211	216	220	224	229	233	238	242	247	251
983	255	260	264	269	273	277	282	286	291	295
984	300	304	308	313	317	322	326	330	335̄	339
985	344	348	352	357	361	366	370	374	379	383
986	388	392	396	401	405	410	414	419	423	427
987	432	436	441	445̄	449	454	458	463	467	471
988	476	480	484	489	493	498	502	506	511	515
989	520	524	528	533	537	542	546	550	555̄	559
990	564	568	572	577	581	585	590	594	599	603
991	607	612	616	621	625̄	629	634	638	642	647
992	651	656	660	664	669	673	677	682	686	691
993	695̄	699	704	708	712	717	721	726	730	734
994	739	743	747	752	756	760	765̄	769	774	778
995	782	787	791	795	800	804	808	813	817	822
996	826	830	835̄	839	843	848	852	856	861	865
997	870	874	878	883	887	891	896	900	904	909
998	913	917	922	926	930	935̄	939	944	948	952
999	957	961	965	970	974	978	983	987	991	996
1000	00 000	004	009	013	017	022	026	030	035	039
N	L 0	1	2	3	4	5	6	7	8	9

P P

	5
1	0.5
2	1.0
3	1.5
4	2.0
5	2.5
6	3.0
7	3.5
8	4.0
9	4.5

	4
1	0.4
2	0.8
3	1.2
4	1.6
5	2.0
6	2.4
7	2.8
8	3.2
9	3.6

P P

TABLE 6. TABLE OF NATURAL OR NAPERIAN LOGARITHMS, .01–11.09

To find the natural logarithm of a number which is 1/10 or 10 times a number whose logarithm is given, subtract from or add to the given logarithm the logarithm of 10.

A 0.00–0.99

-10 should be appended to each logarithm

N	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0		5.395	6.088	6.493	6.781	7.004	7.187	7.341	7.474	7.592
0.1	7.697	7.793	7.880	7.960	8.034	8.103	8.167	8.228	8.285	8.339
0.2	8.391	8.439	8.486	8.530	8.573	8.614	8.653	8.691	8.727	8.762
0.3	8.796	8.829	8.861	8.891	8.921	8.950	8.978	9.006	9.032	9.058
0.4	9.084	9.108	9.132	9.156	9.179	9.201	9.223	9.245	9.266	9.287
0.5	9.307	9.327	9.346	9.365	9.384	9.402	9.420	9.438	9.455	9.472
0.6	9.489	9.506	9.522	9.538	9.554	9.569	9.584	9.600	9.614	9.629
0.7	9.643	9.658	9.671	9.685	9.699	9.712	9.726	9.739	9.752	9.764
0.8	9.777	9.789	9.802	9.814	9.826	9.837	9.849	9.861	9.872	9.883
0.9	9.895	9.906	9.917	9.927	9.938	9.949	9.959	9.970	9.980	9.990

B 1.00-10.09

N	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
1.0	0.0 0000	0995	1980	2956	3922	4879	5827	6766	7696	8618
1.1	9531	*0436	*1333	*2222	*3103	*3976	*4842	*5700	*6551	*7395
1.2	0.1 8232	9062	9885	*0701	*1511	*2314	*3111	*3902	*4686	*5464
1.3	0.2 6236	7003	7763	8518	9267	*0010	*0748	*1481	*2208	*2930
1.4	0.3 3647	4359	5066	5767	6464	7156	7844	8526	9204	9878
1.5	0.4 0547	1211	1871	2527	3178	3825	4469	5108	5742	6373
1.6	7000	7623	8243	8858	9470	*0078	*0682	*1282	*1879	*2473
1.7	0.5 3063	3649	4232	4812	5389	5962	6531	7098	7661	8222
1.8	8779	9333	9884	*0432	*0977	*1519	*2058	*2594	*3127	*3658
1.9	0.6 4185	4710	5233	5752	6269	6783	7294	7803	8310	8813
2.0	9315	9813	*0310	*0804	*1295	*1784	*2271	*2755	*3237	*3716
2.1	0.7 4194	4669	5142	5612	6081	6547	7011	7473	7932	8390
2.2	8846	9299	9751	*0200	*0648	*1093	*1536	*1978	*2418	*2855
2.3	0.8 3291	3725	4157	4587	5015	5442	5866	6289	6710	7129
2.4	7547	7963	8377	8789	9200	9609	*0016	*0422	*0826	*1228
2.5	0.9 1629	2028	2426	2822	3216	3609	4001	4391	4779	5166
2.6	5551	5935	6317	6698	7078	7456	7833	8208	8582	8954
2.7	9325	9695	*0063	*0430	*0796	*1160	*1523	*1885	*2245	*2604
2.8	1.0 2962	3318	3674	4028	4380	4732	5082	5431	5779	6126
2.9	6471	6815	7158	7500	7841	8181	8519	8856	9192	9527
3.0	9861	*0194	*0526	*0856	*1186	*1514	*1841	*2168	*2493	*2817
3.1	1.1 3140	3462	3783	4103	4422	4740	5057	5373	5688	6002
3.2	6315	6627	6938	7248	7557	7865	8173	8479	8784	9089
3.3	9392	9695	9996	*0297	*0597	*0896	*1194	*1491	*1788	*2083
3.4	1.2 2378	2671	2964	3256	3547	3837	4127	4415	4703	4990
3.5	5276	5562	5846	6130	6413	6695	6976	7257	7536	7815
3.6	8093	8371	8647	8923	9198	9473	9746	*0019	*0291	*0563
3.7	1.3 0833	1103	1372	1641	1909	2176	2442	2708	2972	3237
3.8	3500	3763	4025	4286	4547	4807	5067	5325	5584	5841
3.9	6098	6354	6609	6864	7118	7372	7624	7877	8128	8379
4.0	8629	8879	9128	9377	9624	9872	*0118	*0364	*0610	*0854
4.1	1.4 1099	1342	1585	1828	2070	2311	2552	2792	3031	3270
4.2	3508	3746	3984	4220	4456	4692	4927	5161	5395	5629
4.3	5862	6094	6326	6557	6787	7018	7247	7476	7705	7933
4.4	8160	8387	8614	8840	9065	9290	9515	9739	9962	0185
4.5	1.5 0408	0630	0851	1072	1293	1513	1732	1951	2170	2388
4.6	2606	2823	3039	3256	3471	3687	3902	4116	4330	4543
4.7	4756	4969	5181	5393	5604	5814	6025	6235	6444	6653
4.8	6862	7070	7277	7485	7691	7898	8104	8309	8515	8719
4.9	8924	9127	9331	9534	9737	9939	*0141	*0342	*0543	*0744
5.0	1.6 0944	1144	1343	1542	1741	1939	2137	2334	2531	2728
5.1	2924	3120	3315	3511	3705	3900	4094	4287	4481	4673
5.2	4866	5058	5250	5441	5632	5823	6013	6203	6393	6582
5.3	6771	6959	7147	7335	7523	7710	7896	8083	8269	8455
5.4	8640	8825	9010	9194	9378	9562	9745	9928	*0111	*0293

Source: Reproduced from C. D. Hodgman, *Mathematical Tables* (7th ed.: Cleveland, Ohio: Chemical Rubber Publishing Co., 1941), pp. 139–142.

NATURAL LOGARITHMS

B 1.00-10.09 (Concluded)

N	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
5.5	1.7 0475	0656	0838	1019	1199	1380	1560	1740	1919	2098
5.6	2277	2455	2633	2811	2988	3166	3342	3519	3695	3871
5.7	4047	4222	4397	4572	4746	4920	5094	5267	5440	5613
5.8	5786	5958	6130	6302	6473	6644	6815	6985	7156	7326
5.9	7495	7665	7834	8002	8171	8339	8507	8675	8842	9009
6.0	9176	9342	9509	9675	9840	*0006	*0171	*0336	*0500	*0665
6.1	1.8 0829	0993	1156	1319	1482	1645	1808	1970	2132	2294
6.2	2455	2616	2777	2938	3098	3258	3418	3578	3737	3896
6.3	4055	4214	4372	4530	4688	4845	5003	5160	5317	5473
6.4	5630	5786	5942	6097	6253	6408	6563	6718	6872	7026
6.5	7180	7334	7487	7641	7794	7947	8099	8251	8403	8555
6.6	8707	8858	9010	9160	9311	9462	9612	9762	9912	*0061
6.7	1.9 0211	0360	0509	0658	0806	0954	1102	1250	1398	1545
6.8	1692	1839	1986	2132	2279	2425	2571	2716	2862	3007
6.9	3152	3297	3442	3586	3730	3874	4018	4162	4305	4448
7.0	4591	4734	4876	5019	5161	5303	5445	5586	5727	5869
7.1	6009	6150	6291	6431	6571	6711	6851	6991	7130	7269
7.2	7408	7547	7685	7824	7962	8100	8238	8376	8513	8650
7.3	8787	8924	9061	9198	9334	9470	9606	9742	9877	*0013
7.4	2.0 0148	0283	0418	0553	0687	0821	0956	1089	1223	1357
7.5	1490	1624	1757	1890	2022	2155	2287	2419	2551	2683
7.6	2815	2946	3078	3209	3340	3471	3601	3732	3862	3992
7.7	4122	4252	4381	4511	4640	4769	4898	5027	5156	5284
7.8	5412	5540	5668	5796	5924	6051	6179	6306	6433	6560
7.9	6686	6813	6939	7065	7191	7317	7443	7568	7694	7819
8.0	7944	8069	8194	8318	8443	8567	8691	8815	8939	9063
8.1	9186	9310	9433	9556	9679	9802	9924	*0047	*0169	*0291
8.2	2.1 0413	0535	0657	0779	0900	1021	1142	1263	1384	1505
8.3	1626	1746	1866	1986	2106	2226	2346	2465	2585	2704
8.4	2823	2942	3061	3180	3298	3417	3535	3653	3771	3889
8.5	4007	4124	4242	4359	4476	4593	4710	4827	4943	5060
8.6	5176	5292	5409	5524	5640	5756	5871	5987	6102	6217
8.7	6332	6447	6562	6677	6791	6905	7020	7134	7248	7361
8.8	7475	7589	7702	7816	7929	8042	8155	8267	8380	8493
8.9	8605	8717	8830	8942	9054	9165	9277	9389	9500	9611
9.0	9722	9834	9944	*0055	*0166	*0276	*0387	*0497	*0607	*0717
9.1	2.2 0827	0937	1047	1157	1266	1375	1485	1594	1703	1812
9.2	1920	2029	2138	2246	2354	2462	2570	2678	2786	2894
9.3	3001	3109	3216	3324	3431	3538	3645	3751	3858	3965
9.4	4071	4177	4284	4390	4496	4601	4707	4813	4918	5024
9.5	5129	5234	5339	5444	5549	5654	5759	5863	5968	6072
9.6	6176	6280	6384	6488	6592	6696	6799	6903	7006	7109
9.7	7213	7316	7419	7521	7624	7727	7829	7932	8034	8136
9.8	8238	8340	8442	8544	8646	8747	8849	8950	9051	9152
9.9	9253	9354	9455	9556	9657	9757	9858	9958	*0058	*0158
10.0	2.3 0259	0358	0458	0558	0658	0757	0857	0956	1055	1154

C 10-99

N	0	1	2	3	4	5	6	7	8	9
1	2.30259	39790	48491	56495	63906	70805	77259	83321	89037	94444
2	99573	*04452	*09104	*13549	*17805	*21888	*25810	*29584	*33220	*36730
3	3.40120	43399	46574	49651	52636	55535	58352	61092	63759	66356
4	68888	71357	73767	76120	78419	80666	82864	85015	87120	89182
5	91202	93183	95124	97029	98898	*00733	*02535	*04305	*06044	*07754
6	4.09434	11087	12713	14313	15888	17439	18965	20469	21951	23411
7	24850	26268	27667	29046	30407	31749	33073	34381	35671	36945
8	38203	39445	40672	41884	43082	44265	45435	46591	47734	48864
9	49981	51086	52179	53260	54329	55388	56435	57471	58497	59512

NATURAL LOGARITHMS

D 100-1109

N	0	1	2	3	4	5	6	7	8	9
10	4.6 0517	1512	2497	3473	4439	5396	6344	7283	8213	9135
11	4.7 0048	0953	1850	2739	3620	4493	5359	6217	7068	7912
12	8749	9579	*0402	*1218	*2028	*2831	*3628	*4419	*5203	*5981
13	4.8 6753	7520	8280	9035	9784	*0527	*1265	*1998	*2725	*3447
14	4.9 4164	4876	5583	6284	6981	7673	8361	9043	9721	*0395
15	5.0 1064	1728	2388	3044	3695	4343	4986	5625	6260	6890
16	7517	8140	8760	9375	9987	*0595	*1199	*1799	*2396	*2990
17	5.1 3580	4166	4749	5329	5906	6479	7048	7615	8178	8739
18	9296	9850	*0401	*0949	*1494	*2036	*2575	*3111	*3644	*4175
19	5.2 4702	5227	5750	6269	6786	7300	7811	8320	8827	9330
20	9832	*0330	*0827	*1321	*1812	*2301	*2788	*3272	*3754	*4233
21	5.3 4711	5186	5659	6129	6598	7064	7528	7990	8450	8907
22	9363	9816	*0268	*0717	*1165	*1610	*2053	*2495	*2935	*3372
23	5.4 3808	4242	4674	5104	5532	5959	6383	6806	7227	7646
24	8064	8480	8894	9306	9717	*0126	*0533	*0939	*1343	*1745
25	5.5 2146	2545	2943	3339	3733	4126	4518	4908	5296	5683
26	6068	6452	6834	7215	7595	7973	8350	8725	9099	9471
27	9842	*0212	*0580	*0947	*1313	*1677	*2040	*2402	*2762	*3121
28	5.6 3479	3835	4191	4545	4897	5249	5599	5948	6296	6643
29	6988	7332	7675	8017	8358	8698	9036	9373	9709	*0044
30	5.7 0378	0711	1043	1373	1703	2031	2359	2685	3010	3334
31	3657	3979	4300	4620	4939	5257	5574	5890	6205	6519
32	6832	7144	7455	7765	8074	8383	8690	8996	9301	9606
33	9909	*0212	*0513	*0814	*1114	*1413	*1711	*2008	*2305	*2600
34	5.8 2895	3188	3481	3773	4064	4354	4644	4932	5220	5507
35	5793	6079	6363	6647	6930	7212	7493	7774	8053	8332
36	8610	8888	9164	9440	9715	9990	*0263	*0536	*0808	*1080
37	5.9 1350	1620	1889	2158	2426	2693	2959	3225	3489	3754
38	4017	4280	4542	4803	5064	5324	5584	5842	6101	6358
39	6615	6871	7126	7381	7635	7889	8141	8394	8645	8896
40	9146	9396	9645	9894	*0141	*0389	*0635	*0881	*1127	*1372
41	6.0 1616	1859	2102	2345	2587	2828	3069	3309	3548	3787
42	4025	4263	4501	4737	4973	5209	5444	5678	5912	6146
43	6379	6611	6843	7074	7304	7535	7764	7993	8222	8450
44	8677	8904	9131	9357	9582	9807	*0032	*0256	*0479	*0702
45	6.1 0925	1147	1368	1589	1810	2030	2249	2468	2687	2905
46	3123	3340	3556	3773	3988	4204	4419	4633	4847	5060
47	5273	5486	5698	5910	6121	6331	6542	6752	6961	7170
48	7379	7587	7794	8002	8208	8415	8621	8826	9032	9236
49	9441	9644	9848	*0051	*0254	*0456	*0658	*0859	*1060	*1261
50	6.2 1461	1661	1860	2059	2258	2456	2654	2851	3048	3245
51	3441	3637	3832	4028	4222	4417	4611	4804	4998	5190
52	5383	5575	5767	5958	6149	6340	6530	6720	6910	7099
53	7288	7476	7664	7852	8040	8227	8413	8600	8786	8972
54	9157	9342	9527	9711	9895	*0079	*0262	*0445	*0628	*0810
55	6.3 0992	1173	1355	1536	1716	1897	2077	2257	2436	2615
56	2794	2972	3150	3328	3505	3683	3859	4036	4212	4388
57	4564	4739	4914	5089	5263	5437	5611	5784	5957	6130
58	6303	6475	6647	6819	6990	7161	7332	7502	7673	7843
59	8012	8182	8351	8519	8688	8856	9024	9192	9359	9526
60	9693	9859	*0026	*0192	*0357	*0523	*0688	*0853	*1017	*1182
N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**

NATURAL LOGARITHMS

D 100-1109 (Concluded)

N	0	1	2	3	4	5	6	7	8	9
60	6.3 9693	9859	*0026	*0192	*0357	*0523	*0688	*0853	*1017	*1182
61	6.4 1346	1510	1673	1836	1999	2162	2325	2487	2649	2811
62	2972	3133	3294	3455	3615	3775	3935	4095	4254	4413
63	4572	4731	4889	5047	5205	5362	5520	5677	5834	5990
64	6147	6303	6459	6614	6770	6925	7080	7235	7389	7543
65	7697	7851	8004	8158	8311	8464	8616	8768	8920	9072
66	9224	9375	9527	9677	9828	9979	*0129	*0279	*0429	*0578
67	6.5 0728	0877	1026	1175	1323	1471	1619	1767	1915	2062
68	2209	2356	2503	2649	2796	2942	3088	3233	3379	3524
69	3669	3814	3959	4103	4247	4391	4535	4679	4822	4965
70	5108	5251	5393	5536	5678	5820	5962	6103	6244	6386
71	6526	6667	6808	6948	7088	7228	7368	7508	7647	7786
72	7925	8064	8203	8341	8479	8617	8755	8893	9030	9167
73	9304	9441	9578	9715	9851	9987	*0123	*0259	*0394	*0530
74	6.6 0665	0800	0935	1070	1204	1338	1473	1607	1740	1874
75	2007	2141	2274	2407	2539	2672	2804	2936	3068	3200
76	3332	3463	3595	3726	3857	3988	4118	4249	4379	4509
77	4639	4769	4898	5028	5157	5286	5415	5544	5673	5801
78	5929	6058	6185	6313	6441	6568	6696	6823	6950	7077
79	7203	7330	7456	7582	7708	7834	7960	8085	8211	8336
80	8461	8586	8711	8835	8960	9084	9208	9332	9456	9580
81	9703	9827	9950	*0073	*0196	*0319	*0441	*0564	*0686	*0808
82	6.7 0930	1052	1174	1296	1417	1538	1659	1780	1901	2022
83	2143	2263	2383	2503	2623	2743	2863	2982	3102	3221
84	3340	3459	3578	3697	3815	3934	4052	4170	4288	4406
85	4524	4641	4759	4876	4993	5110	5227	5344	5460	5577
86	5693	5809	5926	6041	6157	6273	6388	6504	6619	6734
87	6849	6964	7079	7194	7308	7422	7537	7651	7765	7878
88	7992	8106	8219	8333	8446	8559	8672	8784	8897	9010
89	9122	9234	9347	9459	9571	9682	9794	9906	*0017	*0128
90	6.8 0239	0351	0461	0572	0683	0793	0904	1014	1124	1235
91	1344	1454	1564	1674	1783	1892	2002	2111	2220	2329
92	2437	2546	2655	2763	2871	2979	3087	3195	3303	3411
93	3518	3626	3733	3841	3948	4055	4162	4268	4375	4482
94	4588	4694	4801	4907	5013	5118	5224	5330	5435	5541
95	5646	5751	5857	5961	6066	6171	6276	6380	6485	6589
96	6693	6797	6901	7005	7109	7213	7316	7420	7523	7626
97	7730	7833	7936	8038	8141	8244	8346	8449	8551	8653
98	8755	8857	8959	9061	9163	9264	9366	9467	9568	9669
99	9770	9871	9972	*0073	*0174	*0274	*0375	*0475	*0575	*0675
100	6.9 0776	0875	0975	1075	1175	1274	1374	1473	1572	1672
101	1771	1870	1968	2067	2166	2264	2363	2461	2560	2658
102	2756	2854	2952	3049	3147	3245	3342	3440	3537	3634
103	3731	3828	3925	4022	4119	4216	4312	4409	4505	4601
104	4698	4794	4890	4986	5081	5177	5273	5368	5464	5559
105	5655	5750	5845	5940	6035	6130	6224	6319	6414	6508
106	6602	6697	6791	6885	6979	7073	7167	7261	7354	7448
107	7541	7635	7728	7821	7915	8008	8101	8193	8286	8379
108	8472	8564	8657	8749	8841	8934	9026	9118	9210	9302
109	9393	9485	9577	9668	9760	9851	9942	*0033	*0125	*0216
110	7.0 0307	0397	0488	0579	0670	0760	0851	0941	1031	1121
N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**

TABLE 7. TABLE OF RECIPROCALS, 100–999

N	0	1	2	3	4
100	.01000000	.00990099	.00980392	.00970874	.00961539
110	.00909091	.00900901	.00892857	.00884956	.00877193
120	.00833333	.00826446	.00819672	.00813008	.00806452
130	.00769231	.00763359	.00757576	.00751880	.00746269
140	.00714286	.00709220	.00704225	.00699301	.00694444
150	.00666667	.00662252	.00657895	.00653595	.00649351
160	.00625000	.00621118	.00617284	.00613497	.00609756
170	.00588235	.00584795	.00581395	.00578035	.00574713
180	.00555556	.00552486	.00549451	.00546448	.00543478
190	.00526316	.00523560	.00520833	.00518135	.00515464
200	.00500000	.00497512	.00495050	.00492611	.00490196
210	.00476191	.00473934	.00471698	.00469484	.00467290
220	.00454546	.00452489	.00450451	.00448431	.00446429
230	.00434783	.00432900	.00431035	.00429185	.00427350
240	.00416667	.00414938	.00413223	.00411523	.00409836
250	.00400000	.00398406	.00396825	.00395257	.00393701
260	.00384615	.00383142	.00381679	.00380228	.00378788
270	.00370370	.00369004	.00367647	.00366300	.00364964
280	.00357143	.00355872	.00354610	.00353357	.00352113
290	.00344828	.00343643	.00342466	.00341297	.00340136
300	.00333333	.00332226	.00331126	.00330033	.00328947
310	.00322581	.00321543	.00320513	.00319489	.00318471
320	.00312500	.00311527	.00310559	.00309598	.00308642
330	.00303030	.00302115	.00301205	.00300300	.00299401
340	.00294118	.00293255	.00292398	.00291545	.00290698
350	.00285714	.00284900	.00284091	.00283286	.00282486
360	.00277778	.00277008	.00276243	.00275482	.00274725
370	.00270270	.00269542	.00268817	.00268097	.00267380
380	.00263158	.00262467	.00261780	.00261097	.00260417
390	.00256410	.00255755	.00255102	.00254453	.00253807
400	.00250000	.00249377	.00248756	.00248139	.00247525
410	.00243902	.00243309	.00242718	.00242131	.00241546
420	.00238095	.00237530	.00236967	.00236407	.00235849
430	.00232558	.00232019	.00231482	.00230947	.00230415
440	.00227273	.00226757	.00226244	.00225734	.00225225
450	.00222222	.00221730	.00221239	.00220751	.00220264
460	.00217391	.00216920	.00216450	.00215983	.00215517
470	.00212766	.00212314	.00211864	.00211417	.00210971
480	.00208333	.00207900	.00207469	.00207039	.00206612
490	.00204082	.00203666	.00203252	.00202840	.00202429
500	.00200000	.00199601	.00199203	.00198807	.00198413
510	.00196078	.00195695	.00195313	.00194932	.00194553
520	.00192308	.00191939	.00191571	.00191205	.00190840
530	.00188679	.00188324	.00187970	.00187617	.00187266
540	.00185185	.00184843	.00184502	.00184162	.00183824

RECIPROCALS

5	6	7	8	9	N
.00952381	.00943396	.00934579	.00925926	.00917431	100
.00869565	.00862069	.00854701	.00847458	.00840336	110
.00800000	.00793651	.00787402	.00781250	.00775194	120
.00740741	.00735294	.00729927	.00724638	.00719425	130
.00689655	.00684932	.00680272	.00675676	.00671141	140
.00645161	.00641026	.00636943	.00632911	.00628931	150
.00606061	.00602410	.00598802	.00595238	.00591716	160
.00571429	.00568182	.00564972	.00561798	.00558659	170
.00540541	.00537634	.00534759	.00531915	.00529101	180
.00512821	.00510204	.00507614	.00505051	.00502513	190
.00487805	.00485437	.00483092	.00480769	.00478469	200
.00465116	.00462963	.00460830	.00458716	.00456621	210
.00444444	.00442478	.00440529	.00438597	.00436681	220
.00425532	.00423729	.00421941	.00420168	.00418410	230
.00408163	.00406504	.00404858	.00403226	.00401606	240
.00392157	.00390625	.00389105	.00387597	.00386100	250
.00377359	.00375940	.00374532	.00373134	.00371747	260
.00363636	.00362319	.00361011	.00359712	.00358423	270
.00350877	.00349650	.00348432	.00347222	.00346021	280
.00338983	.00337838	.00336700	.00335571	.00334448	290
.00327869	.00326797	.00325733	.00324675	.00323625	300
.00317460	.00316456	.00315457	.00314465	.00313480	310
.00307692	.00306749	.00305810	.00304878	.00303951	320
.00298508	.00297619	.00296736	.00295858	.00294985	330
.00289855	.00289017	.00288184	.00287356	.00286533	340
.00281690	.00280899	.00280112	.00279330	.00278552	350
.00273973	.00273224	.00272480	.00271739	.00271003	360
.00266667	.00265957	.00265252	.00264550	.00263852	370
.00259740	.00259067	.00258398	.00257732	.00257069	380
.00253165	.00252525	.00251889	.00251256	.00250627	390
.00246914	.00246305	.00245700	.00245098	.00244499	400
.00240964	.00240385	.00239808	.00239234	.00238664	410
.00235294	.00234742	.00234192	.00233645	.00233100	420
.00229885	.00229358	.00228833	.00228311	.00227790	430
.00224719	.00224215	.00223714	.00223214	.00222717	440
.00219780	.00219298	.00218818	.00218341	.00217865	450
.00215054	.00214592	.00214133	.00213675	.00213220	460
.00210526	.00210084	.00209644	.00209205	.00208768	470
.00206186	.00205761	.00205339	.00204918	.00204499	480
.00202020	.00201613	.00201207	.00200803	.00200401	490
.00198020	.00197629	.00197239	.00196850	.00196464	500
.00194175	.00193798	.00193424	.00193050	.00192678	510
.00190476	.00190114	.00189753	.00189394	.00189036	520
.00186916	.00186567	.00186220	.00185874	.00185529	530
.00183486	.00183150	.00182815	.00182482	.00182149	540

RECIPROCALS

N	0	1	2	3	4
550	.00181818	.00181488	.00181159	.00180832	.00180505
560	.00178571	.00178253	.00177936	.00177620	.00177305
570	.00175439	.00175131	.00174825	.00174520	.00174216
580	.00172414	.00172117	.00171821	.00171527	.00171233
590	.00169492	.00169205	.00168919	.00168634	.00168350
600	.00166667	.00166389	.00166113	.00165838	.00165563
610	.00163934	.00163666	.00163399	.00163132	.00162866
620	.00161290	.00161031	.00160772	.00160514	.00160256
630	.00158730	.00158479	.00158228	.00157978	.00157729
640	.00156250	.00156006	.00155763	.00155521	.00155280
650	.00153846	.00153610	.00153374	.00153139	.00152905
660	.00151515	.00151286	.00151057	.00150830	.00150602
670	.00149254	.00149031	.00148810	.00148588	.00148368
680	.00147059	.00146843	.00146628	.00146413	.00146199
690	.00144928	.00144718	.00144509	.00144300	.00144092
700	.00142857	.00142653	.00142450	.00142248	.00142046
710	.00140845	.00140647	.00140449	.00140253	.00140056
720	.00138889	.00138696	.00138504	.00138313	.00138122
730	.00136986	.00136799	.00136612	.00136426	.00136240
740	.00135135	.00134953	.00134771	.00134590	.00134409
750	.00133333	.00133156	.00132979	.00132802	.00132626
760	.00131579	.00131406	.00131234	.00131062	.00130890
770	.00129870	.00129702	.00129534	.00129366	.00129199
780	.00128205	.00128041	.00127877	.00127714	.00127551
790	.00126582	.00126422	.00126263	.00126103	.00125945
800	.00125000	.00124844	.00124688	.00124533	.00124378
810	.00123457	.00123305	.00123153	.00123001	.00122850
820	.00121951	.00121803	.00121655	.00121507	.00121359
830	.00120482	.00120337	.00120192	.00120048	.00119904
840	.00119048	.00118906	.00118765	.00118624	.00118483
850	.00117647	.00117509	.00117371	.00117233	.00117096
860	.00116279	.00116144	.00116009	.00115875	.00115741
870	.00114943	.00114811	.00114679	.00114548	.00114417
880	.00113636	.00113507	.00113379	.00113250	.00113122
890	.00112360	.00112233	.00112108	.00111982	.00111857
900	.00111111	.00110988	.00110865	.00110742	.00110620
910	.00109890	.00109770	.00109649	.00109529	.00109409
920	.00108696	.00108578	.00108460	.00108342	.00108225
930	.00107527	.00107411	.00107296	.00107181	.00107066
940	.00106383	.00106270	.00106157	.00106045	.00105932
950	.00105263	.00105153	.00105042	.00104932	.00104822
960	.00104167	.00104058	.00103950	.00103842	.00103734
970	.00103093	.00102987	.00102881	.00102775	.00102669
980	.00102041	.00101937	.00101833	.00101729	.00101626
990	.00101010	.00100908	.00100807	.00100705	.00100604

RECIPROCALS

5	6	7	8	9	N
.00180180	.00179856	.00179533	.00179212	.00178891	550
.00176991	.00176678	.00176367	.00176056	.00175747	560
.00173913	.00173611	.00173310	.00173010	.00172712	570
.00170940	.00170649	.00170358	.00170068	.00169779	580
.00168067	.00167785	.00167504	.00167224	.00166945	590
.00165289	.00165017	.00164745	.00164474	.00164204	600
.00162602	.00162338	.00162075	.00161812	.00161551	610
.00160000	.00159744	.00159490	.00159236	.00158983	620
.00157480	.00157233	.00156986	.00156740	.00156495	630
.00155039	.00154799	.00154560	.00154321	.00154083	640
.00152672	.00152439	.00152207	.00151976	.00151745	650
.00150376	.00150150	.00149925	.00149701	.00149477	660
.00148148	.00147929	.00147711	.00147493	.00147275	670
.00145985	.00145773	.00145560	.00145349	.00145138	680
.00143885	.00143678	.00143472	.00143267	.00143062	690
.00141844	.00141643	.00141443	.00141243	.00141044	700
.00139860	.00139665	.00139470	.00139276	.00139082	710
.00137931	.00137741	.00137552	.00137363	.00137174	720
.00136054	.00135870	.00135685	.00135501	.00135318	730
.00134228	.00134048	.00133869	.00133690	.00133511	740
.00132450	.00132275	.00132100	.00131926	.00131752	750
.00130719	.00130548	.00130378	.00130208	.00130039	760
.00129032	.00128866	.00128700	.00128535	.00128370	770
.00127389	.00127227	.00127065	.00126904	.00126743	780
.00125786	.00125628	.00125471	.00125313	.00125156	790
.00124224	.00124070	.00123916	.00123762	.00123609	800
.00122699	.00122549	.00122399	.00122249	.00122100	810
.00121212	.00121065	.00120919	.00120773	.00120627	820
.00119761	.00119617	.00119474	.00119332	.00119190	830
.00118343	.00118203	.00118064	.00117925	.00117786	840
.00116959	.00116822	.00116686	.00116550	.00116414	850
.00115607	.00115473	.00115340	.00115207	.00115075	860
.00114286	.00114155	.00114025	.00113895	.00113766	870
.00112994	.00112867	.00112740	.00112613	.00112486	880
.90111732	.00111607	.00111483	.00111359	.00111235	890
.00110497	.00110375	.00110254	.00110132	.00110011	900
.00109290	.00109170	.00109051	.00108933	.00108814	910
.00108108	.00107991	.00107875	.00107759	.00107643	920
.00106952	.00106838	.00106724	.00106610	.00106496	930
.00105820	.00105708	.00105597	.00105485	.00105374	940
.00104712	.00104603	.00104493	.00104384	.00104275	950
.00103627	.00103520	.00103413	.00103306	.00103199	960
.00102564	.00102459	.00102354	.00102250	.00102145	970
.00101523	.00101420	.00101317	.00101215	.00101112	980
.00100503	.00100402	.00100301	.00100200	.00100100	990

TABLE 8. TABLE OF FACTORIALS, 1–15

N	Factorial N N!
1	1
2	2
3	6
4	24
5	120
6	720
7	5040
8	40320
9	362880
10	3628800
11	39916800
12	479001600
13	6227020800
14	87178921200
15	1307674368000

TABLE 9. TABLE OF LOGARITHMS OF FACTORIALS, 1–1,000

n	log $\underline{\lfloor n}$	*n*	log $\underline{\lfloor n}$	*n*	log $\underline{\lfloor n}$	*n*	log $\underline{\lfloor n}$
1	·000 0000	51	66·190 6450	101	159·974 3250	151	264·935 8704
2	·301 0300	52	67·906 6484	102	161·982 9252	152	267·117 7139
3	·778 1513	53	69·630 9243-	103	163·995 7624	153	269·302 4054
4	1·380 2112	54	71·363 3180	104	166·012 7958	154	271·489 9261
5	2·079 1812	55	73·103 6807	105	168·033 9851	155	273·680 2578
6	2·857 3325	56	74·851 8687	106	170·059 2909	156	275·873 3824
7	3·702 4305	57	76·607 7436	107	172·088 6747	157	278·069 2820
8	4·605 5205	58	78·371 1716	108	174·122 0985	158	280·267 9391
9	5·559 7630	59	80·142 0236	109	176·159 5250	159	282·469 3363
10	6·559 7630	60	81·920 1748	110	178·200 9176	160	284·673 4562
11	7·601 1557	61	83·705 5047	111	180·246 2406	161	286·880 2821
12	8·680 3370	62	85·497 8964	112	182·295 4586	162	289·089 7971
13	9·794 2803	63	87·297 2369	113	184·348 5371	163	291·301 9847
14	10·940 4084	64	89·103 4169	114	186·405 4419	164	293·516 8286
15	12·116 4996	65	90·916 3303	115	188·466 1398	165	295·734 3125
16	13·320 6196	66	92·735 8742	116	190·530 5978	166	297·954 4206
17	14·551 0685	67	94·561 9490	117	192·598 7836	167	300·177 1371
18	15·806 3410	68	96·394 4579	118	194·670 6656	168	302·402 4464
19	17·085 0946	69	98·233 3070	119	196·746 2126	169	304·630 3331
20	18·386 1246	70	100·078 4050	120	198·825 3938	170	306·860 7820
21	19·708 3439	71	101·929 6634	121	200·908 1792	171	309·093 7781
22	21·050 7666	72	103·786 9959	122	202·994 5390	172	311·329 3066
23	22·412 4944	73	105·650 3187	123	205·084 4442	173	313·567 3527
24	23·792 7057	74	107·519 5505	124	207·177 8658	174	315·807 9019
25	25·190 6457	75	109·394 6117	125	209·274 7759	175	318·050 9400
26	26·605 6190	76	111·275 4253	126	211·375 1464	176	320·296 4526
27	28·036 9828	77	113·161 9160	127	213·478 9501	177	322·544 4259
28	29·484 1408	78	115·054 0106	128	215·586 1601	178	324·794 8459
29	30·946 5388	79	116·951 6377	129	217·696 7498	179	327·047 6989
30	32·423 6601	80	118·854 7277	130	219·810 6932	180	329·302 9714
31	33·915 0218	81	120·763 2127	131	221·927 9645	181	331·560 6500
32	35·420 1717	82	122·677 0266	132	224·048 5384	182	333·820 7214
33	36·938 6857	83	124·596 1047	133	226·172 3900	183	336·083 1725
34	38·470 1646	84	126·520 3840	134	228·299 4948	184	338·347 9903
35	40·014 2326	85	128·449 8029	135	230·429 8286	185	340·615 1620
36	41·570 5351	86	130·384 3013	136	232·563 3675	186	342·884 6750
37	43·138 7369	87	132·323 8206	137	234·700 0881	187	345·156 5166
38	44·718 5205	88	134·268 3033	138	236·839 9672	188	347·430 6744
39	46·309 5851	89	136·217 6933	139	238·982 9820	189	349·707 1362
40	47·911 6451	90	138·171 9358	140	241·129 1100	190	351·985 8898
41	49·524 4289	91	140·130 9772	141	243·278 3291	191	354·266 9232
42	51·147 6782	92	142·094 7650	142	245·430 6174	192	356·550 2244
43	52·781 1467	93	144·063 2480	143	247·585 9535	193	358·835 7817
44	54·424 5993	94	146·036 3758	144	249·744 3160	194	361·123 5835
45	56·077 8119	95	148·014 0994	145	251·905 6840	195	363·413 6181
46	57·740 5697	96	149·996 3707	146	254·070 0368	196	365·705 8742
47	59·412 6676	97	151·983 1424	147	256·237 3542	197	368·000 3404
48	61·093 9088	98	153·974 3685	148	258·407 6159	198	370·297 0056
49	62·784 1049	99	155·970 0037	149	260·580 8022	199	372·595 8586
50	64·483 0749	100	157·970 0037	150	262·756 8934	200	374·896 8886

Source: Reproduced from Karl Pearson, *Tables for Statisticians and Biometricians* (3rd ed.: London: Cambridge University Press, 1930), pp. 98–101. By permission of the Biometrika Trustees and the Department of Statistics, University College, London.

LOGARITHMS OF FACTORIALS

n	log $|\underline{n}$
201	377·200 0847
202	379·505 4361
203	381·812 9321
204	384·122 5623
205	386·434 3161
206	388·748 1834
207	391·064 1537
208	393·382 2170
209	395·702 3633
210	398·024 5826
211	400·348 8651
212	402·675 2009
213	405·003 5805
214	407·333 9943
215	409·666 4328
216	412·000 8865
217	414·337 3463
218	416·675 8027
219	419·016 2469
220	421·358 6695
221	423·703 0618
222	426·049 4148
223	428·397 7197
224	430·747 9677
225	433·100 1502
226	435·454 2586
227	437·810 2845
228	440·168 2193
229	442·528 0548
230	444·889 7827
231	447·253 3946
232	449·618 8826
233	451·986 2385
234	454·355 4544
235	456·726 5223
236	459·099 4343
237	461·474 1826
238	463·850 7596
239	466·229 1575
240	468·609 3687
241	470·991 3857
242	473·375 2011
243	475·760 8074
244	478·148 1972
245	480·537 3633
246	482·928 2984
247	485·320 9954
248	487·715 4470
249	490·111 6464
250	492·509 5864

n	log $|\underline{n}$
251	494·909 2601
252	497·310 6607
253	499·713 7812
254	502·118 6149
255	504·525 1551
256	506·933 3950
257	509·343 3282
258	511·754 9479
259	514·168 2476
260	516·583 2210
261	518·999 8615
262	521·418 1628
263	523·838 1185
264	526·259 7225
265	528·682 9683
266	531·107 8500
267	533·534 3612
268	535·962 4960
269	538·392 2483
270	540·823 6121
271	543·256 5814
272	545·691 1503
273	548·127 3129
274	550·565 0635
275	553·004 3962
276	555·445 3052
277	557·887 7850
278	560·331 8298
279	562·777 4340
280	565·224 5920
281	567·673 2984
282	570·123 5475
283	572·575 3339
284	575·028 6523
285	577·483 4971
286	579·939 8631
287	582·397 7450
288	584·857 1375
289	587·318 0354
290	589·780 4334
291	592·244 3264
292	594·709 7092
293	597·176 5768
294	599·644 9242
295	602·114 7462
296	604·586 0379
297	607·058 7943
298	609·533 0106
299	612·008 6818
300	614·485 8030

n	log $|\underline{n}$
301	616·964 3695
302	619·444 3765
303	621·925 8191
304	624·408 6927
305	626·892 9925
306	629·378 7140
307	631·865 8523
308	634·354 4031
309	636·844 3615
310	639·335 7232
311	641·828 4836
312	644·322 6382
313	646·818 1825
314	649·315 1122
315	651·813 4227
316	654·313 1098
317	656·814 1691
318	659·316 5962
319	661·820 3869
320	664·325 5369
321	666·832 0419
322	669·339 8978
323	671·849 1003
324	674·359 6453
325	676·871 5287
326	679·384 7463
327	681·899 2940
328	684·415 1679
329	686·932 3638
330	689·450 8777
331	691·970 7057
332	694·491 8438
333	697·014 2880
334	699·538 0345
335	702·063 0793
336	704·589 4186
337	707·117 0485
338	709·645 9652
339	712·176 1649
340	714·707 6438
341	717·240 3982
342	719·774 4243
343	722·309 7184
344	724·846 2768
345	727·384 0959
346	729·923 1720
347	732·463 5015
348	735·005 0807
349	737·547 9062
350	740·091 9742

n	log $|\underline{n}$
351	742·637 2813
352	745·183 8240
353	747·731 5987
354	750·280 6020
355	752·830 8303
356	755·382 2803
357	757·934 9485
358	760·488 8316
359	763·043 9260
360	765·600 2285
361	768·157 7357
362	770·716 4443
363	773·276 3509
364	775·837 4523
365	778·399 7452
366	780·963 2262
367	783·527 8923
368	786·093 7401
369	788·660 7665
370	791·228 9682
371	793·798 3421
372	796·368 8851
373	798·940 5939
374	801·513 4655
375	804·087 4968
376	806·662 6846
377	809·239 0260
378	811·816 5178
379	814·395 1570
380	816·974 9406
381	819·555 8655
382	822·137 9289
383	824·721 1277
384	827·305 4589
385	829·890 9196
386	832·477 5069
387	835·065 2179
388	837·654 0496
389	840·243 9992
390	842·835 0638
391	845·427 2406
392	848·020 5267
393	850·614 9192
394	853·210 4154
395	855·807 0125
396	858·404 7077
397	861·003 4982
398	863·603 3813
399	866·204 3542
400	868·806 4142

LOGARITHMS OF FACTORIALS

n	log $\underline{\lvert n}$
401	871·409 5586
402	874·013 7846
403	876·619 0896
404	879·225 4710
405	881·832 9260
406	884·441 4521
407	887·051 0465
408	889·661 7066
409	892·273 4300
410	894·886 2138
411	897·500 0556
412	900·114 9526
413	902·730 9029
414	905·347 9032
415	907·965 9613
416	910·585 0447
417	913·205 1807
418	915·826 3570
419	918·448 5710
420	921·071 8203
421	923·696 1024
422	926·321 4149
423	928·947 7552
424	931·575 1211
425	934·203 5100
426	936·832 9196
427	939·463 3475
428	942·094 7913
429	944·727 2486
430	947·360 7170
431	949·995 1943
432	952·630 6780
433	955·267 1659
434	957·904 6557
435	960·543 1449
436	963·182 6314
437	965·823 1128
438	968·464 5869
439	971·107 0515
440	973·750 5041
441	976·394 9427
442	979·040 3650
443	981·686 7687
444	984·334 1517
445	986·982 5117
446	989·631 8466
447	992·282 1541
448	994·933 4321
449	997·585 6784
450	1000·238 8910

n	log $\underline{\lvert n}$
451	1002·893 0675
452	1005·548 2059
453	1008·204 3041
454	1010·861 3600
455	1013·519 3714
456	1016·178 3362
457	1018·838 2524
458	1021·499 1179
459	1024·160 9306
460	1026·823 6884
461	1029·487 3893
462	1032·152 0313
463	1034·817 6123
464	1037·484 1303
465	1040·151 5832
466	1042·819 9692
467	1045·489 2860
468	1048·159 5319
469	1050·830 7047
470	1053·502 8026
471	1056·175 8235
472	1058·849 7655
473	1061·524 6266
474	1064·200 4050
475	1066·877 0986
476	1069·554 7056
477	1072·233 2239
478	1074·912 6518
479	1077·592 9873
480	1080·274 2286
481	1082·956 3737
482	1085·639 4207
483	1088·323 3678
484	1091·008 2132
485	1093·693 9549
486	1096·380 5912
487	1099·068 1202
488	1101·756 5400
489	1104·445 8488
490	1107·136 0449
491	1109·827 1264
492	1112·519 0915
493	1115·211 9384
494	1117·905 6654
495	1120·600 2706
496	1123·295 7523
497	1125·992 1086
498	1128·689 3380
499	1131·387 4385
500	1134·086 4085

n	log $\underline{\lvert n}$
501	1136·786 2463
502	1139·486 9500
503	1142·188 5180
504	1144·890 9485
505	1147·594 2399
506	1150·298 3904
507	1153·003 3984
508	1155·709 2621
509	1158·415 9798
510	1161·123 5500
511	1163·831 9709
512	1166·541 2409
513	1169·251 3583
514	1171·962 3214
515	1174·674 1286
516	1177·386 7783
517	1180·100 2688
518	1182·814 5986
519	1185·529 7660
520	1188·245 7693
521	1190·962 6070
522	1193·680 2775
523	1196·398 7792
524	1199·118 1105
525	1201·838 2698
526	1204·559 2556
527	1207·281 0662
528	1210·003 7001
529	1212·727 1558
530	1215·451 4316
531	1218·176 5262
532	1220·902 4378
533	1223·629 1650
534	1226·356 7063
535	1229·085 0600
536	1231·814 2248
537	1234·544 1991
538	1237·274 9814
539	1240·006 5702
540	1242·738 9639
541	1245·472 1612
542	1248·206 1605
543	1250·940 9603
544	1253·676 5592
545	1256·412 9557
546	1259·150 1483
547	1261·888 1357
548	1264·626 9162
549	1267·366 4886
550	1270·106 8513

n	log $\underline{\lvert n}$
551	1272·848 0029
552	1275·589 9419
553	1278·332 6671
554	1281·076 1768
555	1283·820 4698
556	1286·565 5446
557	1289·311 3998
558	1292·058 0340
559	1294·805 4458
560	1297·553 6338
561	1300·302 5967
562	1303·052 3330
563	1305·802 8414
564	1308·554 1205
565	1311·306 1690
566	1314·058 9854
567	1316·812 5684
568	1319·566 9168
569	1322·322 0290
570	1325·077 9039
571	1327·834 5400
572	1330·591 9360
573	1333·350 0907
574	1336·109 0026
575	1338·868 6704
576	1341·629 0929
577	1344·390 2687
578	1347·152 1965
579	1349·914 8751
580	1352·678 3031
581	1355·442 4792
582	1358·207 4022
583	1360·973 0708
584	1363·739 4836
585	1366·506 6395
586	1369·274 5371
587	1372·043 1752
588	1374·812 5525
589	1377·582 6678
590	1380·353 5198
591	1383·125 1073
592	1385·897 4290
593	1388·670 4837
594	1391·444 2702
595	1394·218 7871
596	1396·994 0334
597	1399·770 0077
598	1402·546 7089
599	1405·324 1357
600	1408·102 2870

LOGARITHMS OF FACTORIALS

n	log $\lfloor\underline{n}$
601	1410·881 1614
602	1413·660 7579
603	1416·441 0752
604	1419·222 1122
605	1422·003 8676
606	1424·786 3402
607	1427·569 5289
608	1430·353 4324
609	1433·138 0497
610	1435·923 3796
611	1438·709 4208
612	1441·496 1722
613	1444·283 6327
614	1447·071 8011
615	1449·860 6762
616	1452·650 2569
617	1455·440 5420
618	1458·231 5305
619	1461·023 2212
620	1463·815 6129
621	1466·608 7045
622	1469·402 4948
623	1472·196 9829
624	1474·992 1675
625	1477·788 0475
626	1480·584 6218
627	1483·381 8894
628	1486·179 8490
629	1488·978 4997
630	1491·777 8402
631	1494·577 8696
632	1497·378 5866
633	1500·179 9904
634	1502·982 0796
635	1505·784 8533
636	1508·588 3105
637	1511·392 4499
638	1514·197 2706
639	1517·002 7714
640	1519·806 9514
641	1522·615 8094
642	1525·423 3445
643	1528·231 5554
644	1531·040 4413
645	1533·850 0010
646	1536·660 2335
647	1539·471 1378
648	1542·282 7128
649	1545·094 9575
650	1547·907 8709
651	1550·721 4519
652	1553·535 6995
653	1556·350 6126
654	1559·166 1904
655	1561·982 4317
656	1564·799 3355
657	1567·616 9009
658	1570·435 1268
659	1573·254 0122
660	1576·073 5561
661	1578·893 7576
662	1581·714 6156
663	1584·536 1291
664	1587·358 2972
665	1590·181 1188
666	1593·004 5931
667	1595·828 7189
668	1598·653 4954
669	1601·478 9215
670	1604·304 9963
671	1607·131 7188
672	1609·959 0881
673	1612·787 1031
674	1615·615 7630
675	1618·445 0668
676	1621·275 0135
677	1624·105 6022
678	1626·936 8319
679	1629·768 7016
680	1632·601 2106
681	1635·434 3577
682	1638·268 1420
683	1641·102 5627
684	1643·937 6189
685	1646·773 3094
686	1649·609 6335
687	1652·446 5903
688	1655·284 1787
689	1658·122 3979
690	1660·961 2470
691	1663·800 7251
692	1666·640 8312
693	1669·481 5644
694	1672·322 9239
695	1675·164 9087
696	1678·007 5179
697	1680·850 7507
698	1683·694 6061
699	1686·539 0833
700	1689·384 1813
701	1692·229 8994
702	1695·076 2365
703	1697·923 1918
704	1700·770 7644
705	1703·618 9536
706	1706·467 7583
707	1709·317 1777
708	1712·167 2109
709	1715·017 8572
710	1717·869 1155
711	1720·720 9851
712	1723·573 4651
713	1726·426 5546
714	1729·280 2529
715	1732·134 5589
716	1734·989 4719
717	1737·844 9911
718	1740·701 1155
719	1743·557 8444
720	1746·415 1769
721	1749·273 1122
722	1752·131 6494
723	1754·990 7877
724	1757·850 5262
725	1760·710 8642
726	1763·571 8009
727	1766·433 3353
728	1769·295 4667
729	1772·158 1942
730	1775·021 5170
731	1777·885 4344
732	1780·749 9455
733	1783·615 0495
734	1786·480 7455
735	1789·347 0329
736	1792·213 9107
737	1795·081 3782
738	1797·949 4345
739	1800·818 0790
740	1803·687 3107
741	1806·557 1289
742	1809·427 5328
743	1812·298 5216
744	1815·170 0946
745	1818·042 2508
746	1820·914 9897
747	1823·788 3103
748	1826·662 2119
749	1829·536 6937
750	1832·411 7549
751	1835·287 3949
752	1838·163 6127
753	1841·040 4077
754	1843·917 7790
755	1846·795 7260
756	1849·674 2478
757	1852·553 3437
758	1855·433 0129
759	1858·313 2546
760	1861·194 0682
761	1864·075 4529
762	1866·957 4079
763	1869·839 9324
764	1872·723 0258
765	1875·606 6872
766	1878·490 9160
767	1881·375 7113
768	1884·261 0726
769	1887·146 9989
770	1890·033 4896
771	1892·920 5440
772	1895·808 1613
773	1898·696 3408
774	1901·585 0817
775	1904·474 3835
776	1907·364 2452
777	1910·254 6662
778	1913·145 6458
779	1916·037 1832
780	1918·929 2778
781	1921·821 9289
782	1924·715 1356
783	1927·608 8974
784	1930·503 2135
785	1933·398 0831
786	1936·293 5057
787	1939·189 4804
788	1942·086 0066
789	1944·983 0836
790	1947·880 7107
791	1950·778 8872
792	1953·677 6124
793	1956·576 8856
794	1959·476 7061
795	1962·377 0732
796	1965·277 9863
797	1968·179 4446
798	1971·081 4475
799	1973·983 9943
800	1976·887 0842

LOGARITHMS OF FACTORIALS

n	log $\underline{\lvert n}$
801	1979·790 7168
802	1982·694 8911
803	1985·599 6067
804	1988·504 8627
805	1991·410 6586
806	1994·316 9936
807	1997·223 8672
808	2000·131 2785
809	2003·039 2271
810	2005·947 7121
811	2008·856 7329
812	2011·766 2890
813	2014·676 3795
814	2017·587 0039
815	2020·498 1615
816	2023·409 8517
817	2026·322 0737
818	2029·234 8270
819	2032·148 1109
820	2035·061 9248
821	2037·976 2679
822	2040·891 1398
823	2043·806 5396
824	2046·722 4663
825	2049·638 9208
826	2052·555 9008
827	2055·473 4063
828	2058·391 4367
829	2061·309 9912
830	2064·229 0693
831	2067·148 6703
832	2070·068 7936
833	2072·989 4386
834	2075·910 6047
835	2078·832 2912
836	2081·754 4974
837	2084·677 2229
838	2087·600 4669
839	2090·524 2289
840	2093·448 5082
841	2096·373 3042
842	2099·298 6162
843	2102·224 4438
844	2105·150 7863
845	2108·077 6430
846	2111·005 0133
847	2113·932 8967
848	2116·861 2926
849	2119·790 2003
850	2122·719 6192
851	2125·649 5488
852	2128·579 9884
853	2131·510 9374
854	2134·442 3953
855	2137·374 3614
856	2140·306 8352
857	2143·239 8160
858	2146·173 3033
859	2149·107 2964
860	2152·041 7949
861	2154·976 7980
862	2157·912 3053
863	2160·848 3161
864	2163·784 8298
865	2166·721 8459
866	2169·659 3638
867	2172·597 3829
868	2175·535 9027
869	2178·474 9224
870	2181·414 4417
871	2184·354 4598
872	2187·294 9763
873	2190·235 9906
874	2193·177 5020
875	2196·119 5101
876	2199·062 0142
877	2202·005 0138
878	2204·948 5083
879	2207·892 4971
880	2210·836 9798
881	2213·781 9557
882	2216·727 4243
883	2219·673 3850
884	2222·619 8373
885	2225·566 7805
886	2228·514 2143
887	2231·462 1379
888	2234·410 5509
889	2237·359 4526
890	2240·308 8426
891	2243·258 7203
892	2246·209 0852
893	2249·159 9366
894	2252·111 2742
895	2255·063 0972
896	2258·015 4052
897	2260·968 1976
898	2263·921 4740
899	2266·875 2337
900	2269·829 4762
901	2272·784 2010
902	2275·739 4075
903	2278·695 0953
904	2281·651 2637
905	2284·607 9123
906	2287·565 0405
907	2290·522 6478
908	2293·480 7336
909	2296·439 2975
910	2299·398 3389
911	2302·357 8573
912	2305·317 8521
913	2308·278 3229
914	2311·239 2691
915	2314·200 6902
916	2317·162 5856
917	2320·124 9550
918	2323·087 7977
919	2326·051 1132
920	2329·014 9010
921	2331·979 1606
922	2334·943 8915
923	2337·909 0932
924	2340·874 7652
925	2343·840 9069
926	2346·807 5179
927	2349·774 5977
928	2352·742 1456
929	2355·710 1614
930	2358·678 6443
931	2361·647 5940
932	2364·617 0099
933	2367·586 8915
934	2370·557 2384
935	2373·528 0500
936	2376·499 3259
937	2379·471 0655
938	2382·443 2683
939	2385·415 9339
940	2388·389 0618
941	2391·362 6514
942	2394·336 7023
943	2397·311 2140
944	2400·286 1860
945	2403·261 6178
946	2406·237 5089
947	2409·213 8589
948	2412·190 6672
949	2415·167 9334
950	2418·145 6570
951	2421·123 8376
952	2424·102 4745
953	2427·081 5674
954	2430·061 1158
955	2433·041 1192
956	2436·021 5771
957	2439·002 4890
958	2441·983 8545
959	2444·965 6731
960	2447·947 9443
961	2450·930 6677
962	2453·913 8428
963	2456·897 4691
964	2459·881 5461
965	2462·866 0734
966	2465·851 0506
967	2468·836 4770
968	2471·822 3524
969	2474·808 6762
970	2477·795 4479
971	2480·782 6671
972	2483·770 3334
973	2486·758 4462
974	2489·747 0052
975	2492·736 0098
976	2495·725 4596
977	2498·715 3542
978	2501·705 6930
979	2504·696 4757
980	2507·687 7018
981	2510·679 3708
982	2513·671 4823
983	2516·664 0358
984	2519·657 0309
985	2522·650 4672
986	2525·644 3441
987	2528·638 6612
988	2531·633 4182
989	2534·628 6145
990	2537·624 2497
991	2540·620 3233
992	2543·616 8350
993	2546·613 7842
994	2549·611 1706
995	2552·608 9937
996	2555·607 2530
997	2558·605 9482
998	2561·605 0787
999	2564·604 6442
1000	2567·604 6442

TABLE 10. TABLE OF AREAS OF THE NORMAL CURVE

$\frac{x}{\sigma}$	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0159	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2518	.2549
0.7	.2580	.2612	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3233
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3718	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4083	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4430	.4441
1.6	.4452	.4463	.4474	.4485	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4758	.4762	.4767
2.0	.4773	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4865	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4980	.4980	.4981
2.9	.4981	.4982	.4983	.4984	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.49865	.4987	.4987	.4988	.4988	.4988	.4989	.4989	.4989	.4990
3.1	.49903	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993
3.2	.49931									
3.3	.49952									
3.4	.49966									
3.5	.49977									
3.6	.49984									
3.7	.49989									
3.8	.49993									
3.9	.49995									
4.0	.49997									

Source: Herbert Arkin and Raymond R. Colton, *An Outline of Statistical Methods* (4th ed.: New York: Barnes & Noble, 1939).

TABLE 11. TABLE OF ORDINATES OF THE NORMAL CURVE

$\frac{x}{\sigma}$	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	1.00000	.99995	.99980	.99955	.99920	.99875	.99820	.99755	.99685	.99596
0.1	.99501	.99396	.99283	.99158	.99025	.98881	.98728	.98565	.98393	.98211
0.2	.98020	.97819	.97609	.97390	.97161	.96923	.96676	.96420	.96156	.95882
0.3	.95600	.95309	.95010	.94702	.94387	.94055	.93723	.93382	.93024	.92677
0.4	.92312	.91399	.91558	.91169	.90774	.90371	.89961	.89543	.89119	.88688
0.5	.88250	.87805	.87353	.86896	.86432	.85962	.85488	.85006	.84519	.84060
0.6	.83527	.83023	.83514	.82010	.81481	.80957	.80429	.79896	.79459	.78817
0.7	.78270	.77721	.77167	.76610	.76048	.75484	.74916	.74342	.73769	.73193
0.8	.72615	.72033	.71448	.70861	.70272	.69681	.69087	.68493	.67896	.67298
0.9	.66689	.66097	.65494	.64891	.64287	.63683	.63077	.62472	.61865	.61259
1.0	.60653	.60047	.59440	.58834	.58228	.57623	.57017	.56414	.55810	.55209
1.1	.54607	.54007	.53409	.52812	.52214	.51620	.51027	.50437	.49848	.49260
1.2	.48675	.48092	.47511	.46933	.46357	.45793	.45212	.44644	.44078	.43516
1.3	.42956	.42399	.41845	.41294	.40747	.40202	.39661	.39123	.38569	.38058
1.4	.37531	.37007	.36487	.35971	.35459	.34950	.34445	.33944	.33447	.32954
1.5	.32465	.31980	.31500	.31023	.30550	.30082	.29618	.29158	.28702	.28251
1.6	.27804	.27361	.26923	.26489	.26059	.25634	.25213	.24797	.24385	.23978
1.7	.23575	.23176	.22782	.22392	.22008	.21627	.21251	.20879	.20511	.20148
1.8	.19790	.19436	.19086	.18741	.18400	.18064	.17732	.17904	.17081	.16762
1.9	.16448	.16137	.15831	.15530	.15232	.14939	.14650	.14364	.14083	.13806
2.0	.13534	.13265	.13000	.12740	.12483	.12230	.11981	.11737	.11496	.11259
2.1	.11025	.10795	.10570	.10347	.10129	.09914	.09702	.09495	.09290	.09090
2.2	.08892	.08698	.08507	.08320	.08136	.07956	.07778	.07604	.07433	.07265
2.3	.07100	.06939	.06780	.06624	.06471	.06321	.06174	.06029	.05888	.05750
2.4	.05614	.05481	.05350	.05222	.05096	.04973	.04852	.04737	.04618	.04505
2.5	.04394	.04285	.04179	.04074	.03972	.03873	.03775	.03680	.03586	.03494
2.6	.03405	.03317	.03232	.03148	.03066	.02986	.02908	.02831	.02757	.02684
2.7	.02612	.02542	.02474	.02408	.02343	.02280	.02218	.02157	.02098	.02040
2.8	.01984	.01929	.01876	.01823	.01772	.01723	.01674	.01627	.01581	.01536
2.9	.01492	.01449	.01408	.01367	.01328	.01288	.01252	.01215	.01179	.01145
3.0	.01111									
4.0	.00034									

Source: Herbert Arkin and Raymond R. Colton. *An Outline of Statistical Methods* (4th ed.: New York: Barnes & Noble, 1939).

TABLE 12. TABLE OF t*

Degrees of Freedom	Probability				
	0.50	0.10	0.05	0.02	0.01
1	1.000	6.34	12.71	31.82	63.66
2	0.816	2.92	4.30	6.96	9.92
3	.765	2.35	3.18	4.54	5.84
4	.741	2.13	2.78	3.75	4.60
5	.727	2.02	2.57	3.36	4.03
6	.718	1.94	2.45	3.14	3.71
7	.711	1.90	2.36	3.00	3.50
8	.706	1.86	2.31	2.90	3.36
9	.703	1.83	2.26	2.82	3.25
10	.700	1.81	2.23	2.76	3.17
11	.697	1.80	2.20	2.72	3.11
12	.695	1.78	2.18	2.68	3.06
13	.694	1.77	2.16	2.65	3.01
14	.692	1.76	2.14	2.62	2.98
15	.691	1.75	2.13	2.60	2.95
16	.690	1.75	2.12	2.58	2.92
17	.689	1.74	2.11	2.57	2.90
18	.688	1.73	2.10	2.55	2.88
19	.688	1.73	2.09	2.54	2.86
20	.687	1.72	2.09	2.53	2.84
21	.686	1.72	2.08	2.52	2.83
22	.686	1.72	2.07	2.51	2.82
23	.685	1.71	2.07	2.50	2.81
24	.685	1.71	2.06	2.49	2.80
25	.684	1.71	2.06	2.48	2.79
26	.684	1.71	2.06	2.48	2.78
27	.684	1.70	2.05	2.47	2.77
28	.683	1.70	2.05	2.47	2.76
29	.683	1.70	2.04	2.46	2.76
30	.683	1.70	2.04	2.46	2.75
35	.682	1.69	2.03	2.44	2.72
40	.681	1.68	2.02	2.42	2.71
45	.680	1.68	2.02	2.41	2.69
50	.679	1.68	2.01	2.40	2.68
60	.678	1.67	2.00	2.39	2.66
70	.678	1.67	2.00	2.38	2.65
80	.677	1.66	1.99	2.38	2.64
90	.677	1.66	1.99	2.37	2.63
100	.677	1.66	1.98	2.36	2.63
125	.676	1.66	1.98	2.36	2.62
150	.676	1.66	1.98	2.35	2.61
200	.675	1.65	1.97	2.35	2.60
300	.675	1.65	1.97	2.34	2.59
400	.675	1.65	1.97	2.34	2.59
500	.674	1.65	1.96	2.33	2.59
1000	.674	1.65	1.96	2.33	2.58
∞	.674	1.64	1.96	2.33	2.58

*** The greater portion of this table taken from R. A. Fisher's "Statistical Methods for Research Workers," with the permission of the author and his publishers, Oliver and Boyd, London.**

Source: Reproduced by permission from C. H. Goulden, *Methods of Statistical Analysis* (New York: John Wiley & Sons, 1939).

TABLE 13. TABLE OF F

5% (Roman Type) and 1% (**Bold Face Type**) Points for the Distribution of F

n_2	n_1 degrees of freedom (for greater mean square)																								n_2
	1	2	3	4	5	6	7	8	9	10	11	12	14	16	20	24	30	40	50	75	100	200	500	∞	
1	161 **4,052**	200 **4,999**	216 **5,403**	225 **5,625**	230 **5,764**	234 **5,859**	237 **5,928**	239 **5,981**	241 **6,022**	242 **6,056**	243 **6,082**	244 **6,106**	245 **6,142**	246 **6,169**	248 **6,208**	249 **6,234**	250 **6,258**	251 **6,286**	252 **6,302**	253 **6,323**	253 **6,334**	254 **6,352**	254 **6,361**	254 **6,366**	1
2	18.51 **98.49**	19.00 **99.00**	19.16 **99.17**	19.25 **99.25**	19.30 **99.30**	19.33 **99.33**	19.36 **99.34**	19.37 **99.36**	19.38 **99.38**	19.39 **99.40**	19.40 **99.41**	19.41 **99.42**	19.42 **99.43**	19.43 **99.44**	19.44 **99.45**	19.45 **99.46**	19.46 **99.47**	19.47 **99.48**	19.47 **99.48**	19.48 **99.49**	19.49 **99.49**	19.49 **99.49**	19.50 **99.50**	19.50 **99.50**	2
3	10.13 **34.12**	9.55 **30.82**	9.28 **29.46**	9.12 **28.71**	9.01 **28.24**	8.94 **27.91**	8.88 **27.67**	8.84 **27.49**	8.81 **27.34**	8.78 **27.23**	8.76 **27.13**	8.74 **27.05**	8.71 **26.92**	8.69 **26.83**	8.66 **26.69**	8.64 **26.60**	8.62 **26.50**	8.60 **26.41**	8.58 **26.35**	8.57 **26.27**	8.56 **26.23**	8.54 **26.18**	8.54 **26.14**	8.53 **26.12**	3
4	7.71 **21.20**	6.94 **18.00**	6.59 **16.69**	6.39 **15.98**	6.26 **15.52**	6.16 **15.21**	6.09 **14.98**	6.04 **14.80**	6.00 **14.66**	5.96 **14.54**	5.93 **14.45**	5.91 **14.37**	5.87 **14.24**	5.84 **14.15**	5.80 **14.02**	5.77 **13.93**	5.74 **13.83**	5.71 **13.74**	5.70 **13.69**	5.68 **13.61**	5.66 **13.57**	5.65 **13.52**	5.64 **13.48**	5.63 **13.46**	4
5	6.61 **16.26**	5.79 **13.27**	5.41 **12.06**	5.19 **11.39**	5.05 **10.97**	4.95 **10.67**	4.88 **10.45**	4.82 **10.27**	4.78 **10.15**	4.74 **10.05**	4.70 **9.96**	4.68 **9.89**	4.64 **9.77**	4.60 **9.68**	4.56 **9.55**	4.53 **9.47**	4.50 **9.38**	4.46 **9.29**	4.44 **9.24**	4.42 **9.17**	4.40 **9.13**	4.38 **9.07**	4.37 **9.04**	4.36 **9.02**	5
6	5.99 **13.74**	5.14 **10.92**	4.76 **9.78**	4.53 **9.15**	4.39 **8.75**	4.28 **8.47**	4.21 **8.26**	4.15 **8.10**	4.10 **7.98**	4.06 **7.87**	4.03 **7.79**	4.00 **7.72**	3.96 **7.60**	3.92 **7.52**	3.87 **7.39**	3.84 **7.31**	3.81 **7.23**	3.77 **7.14**	3.75 **7.09**	3.72 **7.02**	3.71 **6.99**	3.69 **6.94**	3.68 **6.90**	3.67 **6.88**	6
7	5.59 **12.25**	4.74 **9.55**	4.35 **8.45**	4.12 **7.85**	3.97 **7.46**	3.87 **7.19**	3.79 **7.00**	3.73 **6.84**	3.68 **6.71**	3.63 **6.62**	3.60 **6.54**	3.57 **6.47**	3.52 **6.35**	3.49 **6.27**	3.44 **6.15**	3.41 **6.07**	3.38 **5.98**	3.34 **5.90**	3.32 **5.85**	3.29 **5.78**	3.28 **5.75**	3.25 **5.70**	3.24 **5.67**	3.23 **5.65**	7
8	5.32 **11.26**	4.46 **8.65**	4.07 **7.59**	3.84 **7.01**	3.69 **6.63**	3.58 **6.37**	3.50 **6.19**	3.44 **6.03**	3.39 **5.91**	3.34 **5.82**	3.31 **5.74**	3.28 **5.67**	3.23 **5.56**	3.20 **5.48**	3.15 **5.36**	3.12 **5.28**	3.08 **5.20**	3.05 **5.11**	3.03 **5.06**	3.00 **5.00**	2.98 **4.96**	2.96 **4.91**	2.94 **4.88**	2.93 **4.86**	8
9	5.12 **10.56**	4.26 **8.02**	3.86 **6.99**	3.63 **6.42**	3.48 **6.06**	3.37 **5.80**	3.29 **5.62**	3.23 **5.47**	3.18 **5.35**	3.13 **5.26**	3.10 **5.18**	3.07 **5.11**	3.02 **5.00**	2.98 **4.92**	2.93 **4.80**	2.90 **4.73**	2.86 **4.64**	2.82 **4.56**	2.80 **4.51**	2.77 **4.45**	2.76 **4.41**	2.73 **4.36**	2.72 **4.33**	2.71 **4.31**	9
10	4.96 **10.04**	4.10 **7.56**	3.71 **6.55**	3.48 **5.99**	3.33 **5.64**	3.22 **5.39**	3.14 **5.21**	3.07 **5.06**	3.02 **4.95**	2.97 **4.85**	2.94 **4.78**	2.91 **4.71**	2.86 **4.60**	2.82 **4.52**	2.77 **4.41**	2.74 **4.33**	2.70 **4.25**	2.67 **4.17**	2.64 **4.12**	2.61 **4.05**	2.59 **4.01**	2.56 **3.96**	2.55 **3.93**	2.54 **3.91**	10
11	4.84 **9.65**	3.98 **7.20**	3.59 **6.22**	3.36 **5.67**	3.20 **5.32**	3.09 **5.07**	3.01 **4.88**	2.95 **4.74**	2.90 **4.63**	2.86 **4.54**	2.82 **4.46**	2.79 **4.40**	2.74 **4.29**	2.70 **4.21**	2.65 **4.10**	2.61 **4.02**	2.57 **3.94**	2.53 **3.86**	2.50 **3.80**	2.47 **3.74**	2.45 **3.70**	2.42 **3.66**	2.41 **3.62**	2.40 **3.60**	11
12	4.75 **9.33**	3.88 **6.93**	3.49 **5.95**	3.26 **5.41**	3.11 **5.06**	3.00 **4.82**	2.92 **4.65**	2.85 **4.50**	2.80 **4.39**	2.76 **4.30**	2.72 **4.22**	2.69 **4.16**	2.64 **4.05**	2.60 **3.98**	2.54 **3.86**	2.50 **3.78**	2.46 **3.70**	2.42 **3.61**	2.40 **3.56**	2.36 **3.49**	2.35 **3.46**	2.32 **3.41**	2.31 **3.38**	2.30 **3.36**	12
13	4.67 **9.07**	3.80 **6.70**	3.41 **5.74**	3.18 **5.20**	3.02 **4.86**	2.92 **4.62**	2.84 **4.44**	2.77 **4.30**	2.72 **4.19**	2.67 **4.10**	2.63 **4.02**	2.60 **3.96**	2.55 **3.85**	2.51 **3.78**	2.46 **3.67**	2.42 **3.59**	2.38 **3.51**	2.34 **3.42**	2.32 **3.37**	2.28 **3.30**	2.26 **3.27**	2.24 **3.21**	2.22 **3.18**	2.21 **3.16**	13

The function, $F = e$ with exponent $2z$, is computed in part from Fisher's table VI (7). Additional entries are by interpolation, mostly graphical.

Source: Reproduced from George W. Snedecor, *Statistical Methods* (Ames, Iowa: Iowa State College Press, 1946), pp. 222–225. By permission of the author.

TABLE OF F

5% (ROMAN TYPE) AND 1% (BOLD FACE TYPE) POINTS FOR THE DISTRIBUTION OF F

n_2	n_1 degrees of freedom (for greater mean square)																								n_2
	1	2	3	4	5	6	7	8	9	10	11	12	14	16	20	24	30	40	50	75	100	200	500	∞	
14	4.60 **8.86**	3.74 **6.51**	3.34 **5.56**	3.11 **5.03**	2.96 **4.69**	2.85 **4.46**	2.77 **4.28**	2.70 **4.14**	2.65 **4.03**	2.60 **3.94**	2.56 **3.86**	2.53 **3.80**	2.48 **3.70**	2.44 **3.62**	2.39 **3.51**	2.35 **3.43**	2.31 **3.34**	2.27 **3.26**	2.24 **3.21**	2.21 **3.14**	2.19 **3.11**	2.16 **3.06**	2.14 **3.02**	2.13 **3.00**	14
15	4.54 **8.68**	3.68 **6.36**	3.29 **5.42**	3.06 **4.89**	2.90 **4.56**	2.79 **4.32**	2.70 **4.14**	2.64 **4.00**	2.59 **3.89**	2.55 **3.80**	2.51 **3.73**	2.48 **3.67**	2.43 **3.56**	2.39 **3.48**	2.33 **3.36**	2.29 **3.29**	2.25 **3.20**	2.21 **3.12**	2.18 **3.07**	2.15 **3.00**	2.12 **2.97**	2.10 **2.92**	2.08 **2.89**	2.07 **2.87**	15
16	4.49 **8.53**	3.63 **6.23**	3.24 **5.29**	3.01 **4.77**	2.85 **4.44**	2.74 **4.20**	2.66 **4.03**	2.59 **3.89**	2.54 **3.78**	2.49 **3.69**	2.45 **3.61**	2.42 **3.55**	2.37 **3.45**	2.33 **3.37**	2.28 **3.25**	2.24 **3.18**	2.20 **3.10**	2.16 **3.01**	2.13 **2.96**	2.09 **2.89**	2.07 **2.86**	2.04 **2.80**	2.02 **2.77**	2.01 **2.75**	16
17	4.45 **8.40**	3.59 **6.11**	3.20 **5.18**	2.96 **4.67**	2.81 **4.34**	2.70 **4.10**	2.62 **3.93**	2.55 **3.79**	2.50 **3.68**	2.45 **3.59**	2.41 **3.52**	2.38 **3.45**	2.33 **3.35**	2.29 **3.27**	2.23 **3.16**	2.19 **3.08**	2.15 **3.00**	2.11 **2.92**	2.08 **2.86**	2.04 **2.79**	2.02 **2.76**	1.99 **2.70**	1.97 **2.67**	1.96 **2.65**	17
18	4.41 **8.28**	3.55 **6.01**	3.16 **5.09**	2.93 **4.58**	2.77 **4.25**	2.66 **4.01**	2.58 **3.85**	2.51 **3.71**	2.46 **3.60**	2.41 **3.51**	2.37 **3.44**	2.34 **3.37**	2.29 **3.27**	2.25 **3.19**	2.19 **3.07**	2.15 **3.00**	2.11 **2.91**	2.07 **2.83**	2.04 **2.78**	2.00 **2.71**	1.98 **2.68**	1.95 **2.62**	1.93 **2.59**	1.92 **2.57**	18
19	4.38 **8.18**	3.52 **5.93**	3.13 **5.01**	2.90 **4.50**	2.74 **4.17**	2.63 **3.94**	2.55 **3.77**	2.48 **3.63**	2.43 **3.52**	2.38 **3.43**	2.34 **3.36**	2.31 **3.30**	2.26 **3.19**	2.21 **3.12**	2.15 **3.00**	2.11 **2.92**	2.07 **2.84**	2.02 **2.76**	2.00 **2.70**	1.96 **2.63**	1.94 **2.60**	1.91 **2.54**	1.90 **2.51**	1.88 **2.49**	19
20	4.35 **8.10**	3.49 **5.85**	3.10 **4.94**	2.87 **4.43**	2.71 **4.10**	2.60 **3.87**	2.52 **3.71**	2.45 **3.56**	2.40 **3.45**	2.35 **3.37**	2.31 **3.30**	2.28 **3.23**	2.23 **3.13**	2.18 **3.05**	2.12 **2.94**	2.08 **2.86**	2.04 **2.77**	1.99 **2.69**	1.96 **2.63**	1.92 **2.56**	1.90 **2.53**	1.87 **2.47**	1.85 **2.44**	1.84 **2.42**	20
21	4.32 **8.02**	3.47 **5.78**	3.07 **4.87**	2.84 **4.37**	2.68 **4.04**	2.57 **3.81**	2.49 **3.65**	2.42 **3.51**	2.37 **3.40**	2.32 **3.31**	2.28 **3.24**	2.25 **3.17**	2.20 **3.07**	2.15 **2.99**	2.09 **2.88**	2.05 **2.80**	2.00 **2.72**	1.96 **2.63**	1.93 **2.58**	1.89 **2.51**	1.87 **2.47**	1.84 **2.42**	1.82 **2.38**	1.81 **2.36**	21
22	4.30 **7.94**	3.44 **5.72**	3.05 **4.82**	2.82 **4.31**	2.66 **3.99**	2.55 **3.76**	2.47 **3.59**	2.40 **3.45**	2.35 **3.35**	2.30 **3.26**	2.26 **3.18**	2.23 **3.12**	2.18 **3.02**	2.13 **2.94**	2.07 **2.83**	2.03 **2.75**	1.98 **2.67**	1.93 **2.58**	1.91 **2.53**	1.87 **2.46**	1.84 **2.42**	1.81 **2.37**	1.80 **2.33**	1.78 **2.31**	22
23	4.28 **7.88**	3.42 **5.66**	3.03 **4.76**	2.80 **4.26**	2.64 **3.94**	2.53 **3.71**	2.45 **3.54**	2.38 **3.41**	2.32 **3.30**	2.28 **3.21**	2.24 **3.14**	2.20 **3.07**	2.14 **2.97**	2.10 **2.89**	2.04 **2.78**	2.00 **2.70**	1.96 **2.62**	1.91 **2.53**	1.88 **2.48**	1.84 **2.41**	1.82 **2.37**	1.79 **2.32**	1.77 **2.28**	1.76 **2.26**	23
24	4.26 **7.82**	3.40 **5.61**	3.01 **4.72**	2.78 **4.22**	2.62 **3.90**	2.51 **3.67**	2.43 **3.50**	2.36 **3.36**	2.30 **3.25**	2.26 **3.17**	2.22 **3.09**	2.18 **3.03**	2.13 **2.93**	2.09 **2.85**	2.02 **2.74**	1.98 **2.66**	1.94 **2.58**	1.89 **2.49**	1.86 **2.44**	1.82 **2.36**	1.80 **2.33**	1.76 **2.27**	1.74 **2.23**	1.73 **2.21**	24
25	4.24 **7.77**	3.38 **5.57**	2.99 **4.68**	2.76 **4.18**	2.60 **3.86**	2.49 **3.63**	2.41 **3.46**	2.34 **3.32**	2.28 **3.21**	2.24 **3.13**	2.20 **3.05**	2.16 **2.99**	2.11 **2.89**	2.06 **2.81**	2.00 **2.70**	1.96 **2.62**	1.92 **2.54**	1.87 **2.45**	1.84 **2.40**	1.80 **2.32**	1.77 **2.29**	1.74 **2.23**	1.72 **2.19**	1.71 **2.17**	25
26	4.22 **7.72**	3.37 **5.53**	2.98 **4.64**	2.74 **4.14**	2.59 **3.82**	2.47 **3.59**	2.39 **3.42**	2.32 **3.29**	2.27 **3.17**	2.22 **3.09**	2.18 **3.02**	2.15 **2.96**	2.10 **2.86**	2.05 **2.77**	1.99 **2.66**	1.95 **2.58**	1.90 **2.50**	1.85 **2.41**	1.82 **2.36**	1.78 **2.28**	1.76 **2.25**	1.72 **2.19**	1.70 **2.15**	1.69 **2.13**	26

The function, $F = e$ with exponent $2z$, is computed in part from Fisher's table VI (7). Additional entries are by interpolation, mostly graphical.

TABLE OF F

5% (Roman Type) and 1% (Bold Face Type) Points for the Distribution of F

n_2	n_1 degrees of freedom (for greater mean square)																								n_2
	1	2	3	4	5	6	7	8	9	10	11	12	14	16	20	24	30	40	50	75	100	200	500	∞	
27	4.21 **7.68**	3.35 **5.49**	2.96 **4.60**	2.73 **4.11**	2.57 **3.79**	2.46 **3.56**	2.37 **3.39**	2.30 **3.26**	2.25 **3.14**	2.20 **3.06**	2.16 **2.98**	2.13 **2.93**	2.08 **2.83**	2.03 **2.74**	1.97 **2.63**	1.93 **2.55**	1.88 **2.47**	1.84 **2.38**	1.80 **2.33**	1.76 **2.25**	1.74 **2.21**	1.71 **2.16**	1.68 **2.12**	1.67 **2.10**	27
28	4.20 **7.64**	3.34 **5.45**	2.95 **4.57**	2.71 **4.07**	2.56 **3.76**	2.44 **3.53**	2.36 **3.36**	2.29 **3.23**	2.24 **3.11**	2.19 **3.03**	2.15 **2.95**	2.12 **2.90**	2.06 **2.80**	2.02 **2.71**	1.96 **2.60**	1.91 **2.52**	1.87 **2.44**	1.81 **2.35**	1.78 **2.30**	1.75 **2.22**	1.72 **2.18**	1.69 **2.13**	1.67 **2.09**	1.65 **2.06**	28
29	4.18 **7.60**	3.33 **5.42**	2.93 **4.54**	2.70 **4.04**	2.54 **3.73**	2.43 **3.50**	2.35 **3.33**	2.28 **3.20**	2.22 **3.08**	2.18 **3.00**	2.14 **2.92**	2.10 **2.87**	2.05 **2.77**	2.00 **2.68**	1.94 **2.57**	1.90 **2.49**	1.85 **2.41**	1.80 **2.32**	1.77 **2.27**	1.73 **2.19**	1.71 **2.15**	1.68 **2.10**	1.65 **2.06**	1.64 **2.03**	29
30	4.17 **7.56**	3.32 **5.39**	2.92 **4.51**	2.69 **4.02**	2.53 **3.70**	2.42 **3.47**	2.34 **3.30**	2.27 **3.17**	2.21 **3.06**	2.16 **2.98**	2.12 **2.90**	2.09 **2.84**	2.04 **2.74**	1.99 **2.66**	1.93 **2.55**	1.89 **2.47**	1.84 **2.38**	1.79 **2.29**	1.76 **2.24**	1.72 **2.16**	1.69 **2.13**	1.66 **2.07**	1.64 **2.03**	1.62 **2.01**	30
32	4.15 **7.50**	3.30 **5.34**	2.90 **4.46**	2.67 **3.97**	2.51 **3.66**	2.40 **3.42**	2.32 **3.25**	2.25 **3.12**	2.19 **3.01**	2.14 **2.94**	2.10 **2.86**	2.07 **2.80**	2.02 **2.70**	1.97 **2.62**	1.91 **2.51**	1.86 **2.42**	1.82 **2.34**	1.76 **2.25**	1.74 **2.20**	1.69 **2.12**	1.67 **2.08**	1.64 **2.02**	1.61 **1.98**	1.59 **1.96**	32
34	4.13 **7.44**	3.28 **5.29**	2.88 **4.42**	2.65 **3.93**	2.49 **3.61**	2.38 **3.38**	2.30 **3.21**	2.23 **3.08**	2.17 **2.97**	2.12 **2.89**	2.08 **2.82**	2.05 **2.76**	2.00 **2.66**	1.95 **2.58**	1.89 **2.47**	1.84 **2.38**	1.80 **2.30**	1.74 **2.21**	1.71 **2.15**	1.67 **2.08**	1.64 **2.04**	1.61 **1.98**	1.59 **1.94**	1.57 **1.91**	34
36	4.11 **7.39**	3.26 **5.25**	2.86 **4.38**	2.63 **3.89**	2.48 **3.58**	2.36 **3.35**	2.28 **3.18**	2.21 **3.04**	2.15 **2.94**	2.10 **2.86**	2.06 **2.78**	2.03 **2.72**	1.98 **2.62**	1.93 **2.54**	1.87 **2.43**	1.82 **2.35**	1.78 **2.26**	1.72 **2.17**	1.69 **2.12**	1.65 **2.04**	1.62 **2.00**	1.59 **1.94**	1.56 **1.90**	1.55 **1.87**	36
38	4.10 **7.35**	3.25 **5.21**	2.85 **4.34**	2.62 **3.86**	2.46 **3.54**	2.35 **3.32**	2.26 **3.15**	2.19 **3.02**	2.14 **2.91**	2.09 **2.82**	2.05 **2.75**	2.02 **2.69**	1.96 **2.59**	1.92 **2.51**	1.85 **2.40**	1.80 **2.32**	1.76 **2.22**	1.71 **2.14**	1.67 **2.08**	1.63 **2.00**	1.60 **1.97**	1.57 **1.90**	1.54 **1.86**	1.53 **1.84**	38
40	4.08 **7.31**	3.23 **5.18**	2.84 **4.31**	2.61 **3.83**	2.45 **3.51**	2.34 **3.29**	2.25 **3.12**	2.18 **2.99**	2.12 **2.88**	2.07 **2.80**	2.04 **2.73**	2.00 **2.66**	1.95 **2.56**	1.90 **2.49**	1.84 **2.37**	1.79 **2.29**	1.74 **2.20**	1.69 **2.11**	1.66 **2.05**	1.61 **1.97**	1.59 **1.94**	1.55 **1.88**	1.53 **1.84**	1.51 **1.81**	40
42	4.07 **7.27**	3.22 **5.15**	2.83 **4.29**	2.59 **3.80**	2.44 **3.49**	2.32 **3.26**	2.24 **3.10**	2.17 **2.96**	2.11 **2.86**	2.06 **2.77**	2.02 **2.70**	1.99 **2.64**	1.94 **2.54**	1.89 **2.46**	1.82 **2.35**	1.78 **2.26**	1.73 **2.17**	1.68 **2.08**	1.64 **2.02**	1.60 **1.94**	1.57 **1.91**	1.54 **1.85**	1.51 **1.80**	1.49 **1.78**	42
44	4.06 **7.24**	3.21 **5.12**	2.82 **4.26**	2.58 **3.78**	2.43 **3.46**	2.31 **3.24**	2.23 **3.07**	2.16 **2.94**	2.10 **2.84**	2.05 **2.75**	2.01 **2.68**	1.98 **2.62**	1.92 **2.52**	1.88 **2.44**	1.81 **2.32**	1.76 **2.24**	1.72 **2.15**	1.66 **2.06**	1.63 **2.00**	1.58 **1.92**	1.56 **1.88**	1.52 **1.82**	1.50 **1.78**	1.48 **1.75**	44
46	4.05 **7.21**	3.20 **5.10**	2.81 **4.24**	2.57 **3.76**	2.42 **3.44**	2.30 **3.22**	2.22 **3.05**	2.14 **2.92**	2.09 **2.82**	2.04 **2.73**	2.00 **2.66**	1.97 **2.60**	1.91 **2.50**	1.87 **2.42**	1.80 **2.30**	1.75 **2.22**	1.71 **2.13**	1.65 **2.04**	1.62 **1.98**	1.57 **1.90**	1.54 **1.86**	1.51 **1.80**	1.48 **1.76**	1.46 **1.72**	46
48	4.04 **7.19**	3.19 **5.08**	2.80 **4.22**	2.56 **3.74**	2.41 **3.42**	2.30 **3.20**	2.21 **3.04**	2.14 **2.90**	2.08 **2.80**	2.03 **2.71**	1.99 **2.64**	1.96 **2.58**	1.90 **2.48**	1.86 **2.40**	1.79 **2.28**	1.74 **2.20**	1.70 **2.11**	1.64 **2.02**	1.61 **1.96**	1.56 **1.88**	1.53 **1.84**	1.50 **1.78**	1.47 **1.73**	1.45 **1.70**	48

TABLE OF F

5% (Roman Type) and 1% (Bold Face Type) Points for the Distribution of *F*

n_2	n_1 degrees of freedom (for greater mean square)																								n_2
	1	2	3	4	5	6	7	8	9	10	11	12	14	16	20	24	30	40	50	75	100	200	500	∞	
50	4.03 **7.17**	3.18 **5.06**	2.79 **4.20**	2.56 **3.72**	2.40 **3.41**	2.29 **3.18**	2.20 **3.02**	2.13 **2.88**	2.07 **2.78**	2.02 **2.70**	1.98 **2.62**	1.95 **2.56**	1.90 **2.46**	1.85 **2.39**	1.78 **2.26**	1.74 **2.18**	1.69 **2.10**	1.63 **2.00**	1.60 **1.94**	1.55 **1.86**	1.52 **1.82**	1.48 **1.76**	1.46 **1.71**	1.44 **1.68**	50
55	4.02 **7.12**	3.17 **5.01**	2.78 **4.16**	2.54 **3.68**	2.38 **3.37**	2.27 **3.15**	2.18 **2.98**	2.11 **2.85**	2.05 **2.75**	2.00 **2.66**	1.97 **2.59**	1.93 **2.53**	1.88 **2.43**	1.83 **2.35**	1.76 **2.23**	1.72 **2.15**	1.67 **2.06**	1.61 **1.96**	1.58 **1.90**	1.52 **1.82**	1.50 **1.78**	1.46 **1.71**	1.43 **1.66**	1.41 **1.64**	55
60	4.00 **7.08**	3.15 **4.98**	2.76 **4.13**	2.52 **3.65**	2.37 **3.34**	2.25 **3.12**	2.17 **2.95**	2.10 **2.82**	2.04 **2.72**	1.99 **2.63**	1.95 **2.56**	1.92 **2.50**	1.86 **2.40**	1.81 **2.32**	1.75 **2.20**	1.70 **2.12**	1.65 **2.03**	1.59 **1.93**	1.56 **1.87**	1.50 **1.79**	1.48 **1.74**	1.44 **1.68**	1.41 **1.63**	1.39 **1.60**	60
65	3.99 **7.04**	3.14 **4.95**	2.75 **4.10**	2.51 **3.62**	2.36 **3.31**	2.24 **3.09**	2.15 **2.93**	2 08 **2.79**	2.02 **2.70**	1.98 **2.61**	1.94 **2.54**	1.90 **2.47**	1.85 **2.37**	1.80 **2.30**	1.73 **2.18**	1.68 **2.09**	1.63 **2.00**	1.57 **1.90**	1.54 **1.84**	1.49 **1.76**	1.46 **1.71**	1.42 **1.64**	1.39 **1.60**	1.37 **1.56**	65
70	3.98 **7.01**	3.13 **4.92**	2.74 **4.08**	2.50 **3.60**	2.35 **3.29**	2.23 **3.07**	2.14 **2.91**	2.07 **2.77**	2.01 **2.67**	1.97 **2.59**	1.93 **2.51**	1.89 **2.45**	1.84 **2.35**	1.79 **2.28**	1.72 **2.15**	1.67 **2.07**	1.62 **1.98**	1.56 **1.88**	1.53 **1.82**	1.47 **1.74**	1.45 **1.69**	1.40 **1.62**	1.37 **1.56**	1.35 **1.53**	70
80	3.96 **6.96**	3.11 **4.88**	2.72 **4.04**	2.48 **3.56**	2.33 **3.25**	2.21 **3.04**	2.12 **2.87**	2.05 **2.74**	1.99 **2.64**	1.95 **2.55**	1.91 **2.48**	1.88 **2.41**	1.82 **2.32**	1.77 **2.24**	1.70 **2.11**	1.65 **2.03**	1.60 **1.94**	1.54 **1.84**	1.51 **1.78**	1.45 **1.70**	1.42 **1.65**	1.38 **1.57**	1.35 **1.52**	1.32 **1.49**	80
100	3.94 **6.90**	3.09 **4.82**	2.70 **3.98**	2.46 **3.51**	2.30 **3.20**	2.19 **2.99**	2.10 **2.82**	2.03 **2.69**	1.97 **2.59**	1.92 **2.51**	1.88 **2.43**	1.85 **2.36**	1.79 **2.26**	1.75 **2.19**	1.68 **2.06**	1.63 **1.98**	1.57 **1.89**	1.51 **1.79**	1.48 **1.73**	1.42 **1.64**	1.39 **1.59**	1.34 **1.51**	1.30 **1.46**	1.28 **1.43**	100
125	3.92 **6.84**	3.07 **4.78**	2.68 **3.94**	2.44 **3.47**	2.29 **3.17**	2.17 **2.95**	2.08 **2.79**	2.01 **2.65**	1.95 **2.56**	1.90 **2.47**	1.86 **2.40**	1.83 **2.33**	1.77 **2.23**	1.72 **2.15**	1.65 **2.03**	1.60 **1.94**	1.55 **1.85**	1.49 **1.75**	1.45 **1.68**	1.39 **1.59**	1.36 **1.54**	1.31 **1.46**	1.27 **1.40**	1.25 **1.37**	125
150	3.91 **6.81**	3.06 **4.75**	2.67 **3.91**	2.43 **3.44**	2.27 **3.14**	2.16 **2.92**	2.07 **2.76**	2.00 **2.62**	1.94 **2.53**	1.89 **2.44**	1.85 **2.37**	1.82 **2.30**	1.76 **2.20**	1.71 **2.12**	1.64 **2.00**	1.59 **1.91**	1.54 **1.83**	1.47 **1.72**	1.44 **1.66**	1.37 **1.56**	1.34 **1.51**	1.29 **1.43**	1.25 **1.37**	1.22 **1.33**	150
200	3.89 **6.76**	3.04 **4.71**	2.65 **3.88**	2.41 **3.41**	2.26 **3.11**	2.14 **2.90**	2.05 **2.73**	1.98 **2.60**	1.92 **2.50**	1.87 **2.41**	1.83 **2.34**	1.80 **2.28**	1.74 **2.17**	1.69 **2.09**	1.62 **1.97**	1.57 **1.88**	1.52 **1.79**	1.45 **1.69**	1.42 **1.62**	1.35 **1.53**	1.32 **1.48**	1.26 **1.39**	1.22 **1.33**	1.19 **1.28**	200
400	3.86 **6.70**	3.02 **4.66**	2.62 **3.83**	2.39 **3.36**	2.23 **3.06**	2.12 **2.85**	2.03 **2.69**	1.96 **2.55**	1.90 **2.46**	1.85 **2.37**	1.81 **2.29**	1.78 **2.23**	1.72 **2.12**	1.67 **2.04**	1.60 **1.92**	1.54 **1.84**	1.49 **1.74**	1.42 **1.64**	1.38 **1.57**	1.32 **1.47**	1.28 **1.42**	1.22 **1.32**	1.16 **1.24**	1.13 **1.19**	400
1000	3.85 **6.66**	3.00 **4.62**	2.61 **3.80**	2.38 **3.34**	2.22 **3.04**	2.10 **2.82**	2.02 **2.66**	1.95 **2.53**	1.89 **2.43**	1.84 **2.34**	1.80 **2.26**	1.76 **2.20**	1.70 **2.09**	1.65 **2.01**	1.58 **1.89**	1.53 **1.81**	1.47 **1.71**	1.41 **1.61**	1.36 **1.54**	1.30 **1.44**	1.26 **1.38**	1.19 **1.28**	1.13 **1.19**	1.08 **1.11**	1000
∞	3.84 **6.64**	2.99 **4.60**	2.60 **3.78**	2.37 **3.32**	2.21 **3.02**	2.09 **2.80**	2.01 **2.64**	1.94 **2.51**	1.88 **2.41**	1.83 **2.32**	1.79 **2.24**	1.75 **2.18**	1.69 **2.07**	1.64 **1.99**	1.57 **1.87**	1.52 **1.79**	1.46 **1.69**	1.40 **1.59**	1.35 **1.52**	1.28 **1.41**	1.24 **1.36**	1.17 **1.25**	1.11 **1.15**	1.00 **1.00**	∞

TABLE 14. TABLE OF CHI SQUARE

	Probability													
n	·99	·98	·95	·90	·80	·70	·50	·30	·20	·10	·05	·02	·01	·001
1	$\cdot 0^{3}157$	$\cdot 0^{3}628$	·00393	·0158	·0642	·148	·455	1·074	1·642	2·706	3·841	5·412	6·635	10·827
2	·0201	·0404	·103	·211	·446	·713	1·386	2·408	3·219	4·605	5·991	7·824	9·210	13·815
3	·115	·185	·352	·584	1·005	1·424	2·366	3·665	4·642	6·251	7·815	9·837	11·345	16·268
4	·297	·429	·711	1·064	1·649	2·195	3·357	4·878	5·989	7·779	9·488	11·668	13·277	18·465
5	·554	·752	1·145	1·610	2·343	3·000	4·351	6·064	7·289	9·236	11·070	13·388	15·086	20·517
6	·872	1·134	1·635	2·204	3·070	3·828	5·348	7·231	8·558	10·645	12·592	15·033	16·812	22·457
7	1·239	1·564	2·167	2·833	3·822	4·671	6·346	8·383	9·803	12·017	14·067	16·622	18·475	24·322
8	1·646	2·032	2·733	3·490	4·594	5·527	7·344	9·524	11·030	13·362	15·507	18·168	20·090	26·125
9	2·088	2·532	3·325	4·168	5·380	6·393	8·343	10·656	12·242	14·684	16·919	19·679	21·666	27·877
10	2·558	3·059	3·940	4·865	6·179	7·267	9·342	11·781	13·442	15·987	18·307	21·161	23·209	29·588
11	3·053	3·609	4·575	5·578	6·989	8·148	10·341	12·899	14·631	17·275	19·675	22·618	24·725	31·264
12	3·571	4·178	5·226	6·304	7·807	9·034	11·340	14·011	15·812	18·549	21·026	24·054	26·217	32·909
13	4·107	4·765	5·892	7·042	8·634	9·926	12·340	15·119	16·985	19·812	22·362	25·472	27·688	34·528
14	4·660	5·368	6·571	7·790	9·467	10·821	13·339	16·222	18·151	21·064	23·685	26·873	29·141	36·123
15	5·229	5·985	7·261	8·547	10·307	11·721	14·339	17·322	19·311	22·307	24·996	28·259	30·578	37·697
16	5·812	6·614	7·962	9·312	11·152	12·624	15·338	18·418	20·465	23·542	26·296	29·633	32·000	39·252
17	6·408	7·255	8·672	10·085	12·002	13·531	16·338	19·511	21·615	24·769	27·587	30·995	33·409	40·790
18	7·015	7·906	9·390	10·865	12·857	14·440	17·338	20·601	22·760	25·989	28·869	32·346	34·805	42·312
19	7·633	8·567	10·117	11·651	13·716	15·352	18·338	21·689	23·900	27·204	30·144	33·687	36·191	43·820
20	8·260	9·237	10·851	12·443	14·578	16·266	19·337	22·775	25·038	28·412	31·410	35·020	37·566	45·315
21	8·897	9·915	11·591	13·240	15·445	17·182	20·337	23·858	26·171	29·615	32·671	36·343	38·932	46·797
22	9·542	10·600	12·338	14·041	16·314	18·101	21·337	24·939	27·301	30·813	33·924	37·659	40·289	48·268
23	10·196	11·293	13·091	14·848	17·187	19·021	22·337	26·018	28·429	32·007	35·172	38·968	41·638	49·728
24	10·856	11·992	13·848	15·659	18·062	19·943	23·337	27·096	29·553	33·196	36·415	40·270	42·980	51·179
25	11·524	12·697	14·611	16·473	18·940	20·867	24·337	28·172	30·675	34·382	37·652	41·566	44·314	52·620
26	12·198	13·409	15·379	17·292	19·820	21·792	25·336	29·246	31·795	35·563	38·885	42·856	45·642	54·052
27	12·879	14·125	16·151	18·114	20·703	22·719	26·336	30·319	32·912	36·741	40·113	44·140	46·963	55·476
28	13·565	14·847	16·928	18·939	21·588	23·647	27·336	31·391	34·027	37·916	41·337	45·419	48·278	56·893
29	14·256	15·574	17·708	19·768	22·475	24·577	28·336	32·461	35·139	39·087	42·557	46·693	49·588	58·302
30	14·953	16·306	18·493	20·599	23·364	25·508	29·336	33·530	36·250	40·256	43·773	47·962	50·892	59·703

For larger values of *n*, the expression $\sqrt{2\chi^2}-\sqrt{2n-1}$ may be used as a normal deviate with unit variance, remembering that the probability for χ^2 corresponds with that of a single tail of the normal curve.

Source: Reprinted from R. A. Fisher and F. Yates, *Statistical Tables for Biological, Agricultural, and Medical Research* (Edinburgh: Oliver & Boyd, 1943), Table IV. By permission of the authors and publishers.

TABLE 15. TABLE OF z FOR VALUES OF FROM .00 TO 1.00

$$z_r = \tfrac{1}{2}\,[\log_e(1+r) - \log_e(1-r)] = 1.1513\left[\log\frac{1+r}{1-r}\right]$$

TABLE A. r FROM ZERO TO 0.89 BY HUNDREDTHS

r	.00	.01	.02	.03	.04	.05	.06	.07	.08
.0	.0000	.0100	.0200	.0300	.0400	.0500	.0601	.0701	.0802
.1	.1003	.1104	.1206	.1307	.1409	.1511	.1614	.1717	.1820
.2	.2027	.2132	.2237	.2342	.2448	.2554	.2661	.2769	.2877
.3	.3095	.3205	.3316	.3428	.3541	.3654	.3769	.3884	.4001
.4	.4236	.4356	.4477	.4599	.4722	.4847	.4973	.5101	.5230
.5	.5493	.5627	.5763	.5901	.6042	.6184	.6328	.6475	.6625
.6	.6931	.7089	.7250	.7414	.7582	.7753	.7928	.8107	.8291
.7	.8673	.8872	.9076	.9287	.9505	.9730	.9962	1.0203	1.0454
.8	1.0986	1.1270	1.1568	1.1881	1.2212	1.2562	1.2933	1.3331	1.3758

TABLE B. r FROM 0.900 TO 0.999 BY THOUSANDTHS

r	.000	.001	.002	.003	.004	.005	.006	.007	.008
.90	1.4722	1.4775	1.4828	1.4882	1.4937	1.4992	1.5047	1.5103	1.5160
.91	1.5275	1.5334	1.5393	1.5453	1.5513	1.5574	1.5636	1.5698	1.5762
.92	1.5890	1.5956	1.6022	1.6089	1.6157	1.6226	1.6296	1.6366	1.6438
.93	1.6584	1.6658	1.6734	1.6811	1.6888	1.6967	1.7047	1.7129	1.7211
.94	1.7380	1.7467	1.7555	1.7645	1.7736	1.7828	1.7923	1.8019	1.8117
.95	1.8318	1.8421	1.8527	1.8635	1.8745	1.8857	1.8972	1.9090	1.9210
.96	1.9459	1.9588	1.9721	1.9857	1.9996	2.0139	2.0287	2.0439	2.0595
.97	2.0923	2.1095	2.1273	2.1457	2.1649	2.1847	2.2054	2.2269	2.2494
.98	2.2976	2.3235	2.3507	2.3796	2.4101	2.4427	2.4774	2.5147	2.5550
.99	2.6467	2.6996	2.7587	2.8257	2.9031	2.9945	3.1063	3.2504	3.4534

Source: Reproduced by permission from A. E. Treloar, *Elements of Statistical Reason* (New York: John Wiley & Sons, 1939).

TABLE 16. TABLE OF *r* FOR VALUES OF *z* FROM 0 TO 5*

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.0000	.0100	.0200	.0300	.0400	.0500	.0599	.0699	.0798	.0898
.1	.0997	.1096	.1194	.1293	.1391	.1489	.1587	.1684	.1781	.1878
.2	.1974	.2070	.2165	.2260	.2355	.2449	.2543	.2636	.2729	.2821
.3	.2913	.3004	.3095	.3185	.3275	.3364	.3452	.3540	.3627	.3714
.4	.3800	.3885	.3969	.4053	.4136	.4219	.4301	.4382	.4462	.4542
.5	.4621	.4700	.4777	.4854	.4930	.5005	.5080	.5154	.5227	.5299
.6	.5370	.5441	.5511	.5581	.5649	.5717	.5784	.5850	.5915	.5980
.7	.6044	.6107	.6169	.6231	.6291	.6352	.6411	.6469	.6527	.6584
.8	.6640	.6696	.6751	.6805	.6858	.6911	.6963	.7014	.7064	.7114
.9	.7163	.7211	.7259	.7306	.7352	.7398	.7443	.7487	.7531	.7574
1.0	.7616	.7658	.7699	.7739	.7779	.7818	.7857	.7895	.7932	.7969
1.1	.8005	.8041	.8076	.8110	.8144	.8178	.8210	.8243	.8275	.8306
1.2	.8337	.8367	.8397	.8426	.8455	.8483	.8511	.8538	.8565	.8591
1.3	.8617	.8643	.8668	.8693	.8717	.8741	.8764	.8787	.8810	.8832
1.4	.8854	.8875	.8896	.8917	.8937	.8957	.8977	.8996	.9015	.9033
1.5	.9052	.9069	.9087	.9104	.9121	.9138	.9154	.9170	.9186	.9202
1.6	.9217	.9232	.9246	.9261	.9275	.9289	.9302	.9316	.9329	.9342
1.7	.9354	.9367	.9379	.9391	.9402	.9414	.9425	.9436	.9447	.9458
1.8	.9468	.9478	.9498	.9488	.9508	.9518	.9527	.9536	.9545	.9554
1.9	.9562	.9571	.9579	.9587	.9595	.9603	.9611	.9619	.9626	.9633
2.0	.9640	.9647	.9654	.9661	.9668	.9674	.9680	.9687	.9693	.9699
2.1	.9705	.9710	.9716	.9722	.9727	.9732	.9738	.9743	.9748	.9753
2.2	.9757	.9762	.9767	.9771	.9776	.9780	.9785	.9789	.9793	.9797
2.3	.9801	.9805	.9809	.9812	.9816	.9820	.9823	.9827	.9830	.9834
2.4	.9837	.9840	.9843	.9846	.9849	.9852	.9855	.9858	.9861	.9863
2.5	.9866	.9869	.9871	.9874	.9876	.9879	.9881	.9884	.9886	.9888
2.6	.9890	.9892	.9895	.9897	.9899	.9901	.9903	.9905	.9906	.9908
2.7	.9910	.9912	.9914	.9915	.9917	.9919	.9920	.9922	.9923	.9925
2.8	.9926	.9928	.9929	.9931	.9932	.9933	.9935	.9936	.9937	.9938
2.9	.9940	.9941	.9942	.9943	.9944	.9945	.9946	.9947	.9949	.9950
3.0	.9951									
4.0	.9993									
5.0	.9999									

***The figures in the body of the table are values of *r* corresponding to *z*-values read from the scales on the left and top of the table.**

Source: Reproduced from F. C. Mills, *Statistical Methods* (New York: Henry Holt & Co., 1924), p. 702.

TABLE 17. TABLE OF POISSON DISTRIBUTION FOR SELECTED VALUES OF $\bar{X}$ (POISSON'S EXPONENTIAL BINOMIAI LIMIT)

			$\bar{X}$		
x	.001	.01	.1	1	2
0	.9990005	.9900498	.9048374	.367879	.135335
1	.0009990	.0099005	.0904837	.367879	.270671
2	.0000005	.0000495	.0045242	.183940	.270671
3		.0000002	.0001508	.061313	.180447
4			.0000038	.015328	.090224
5			.0000001	.003066	.036089
6				.000511	.012030
7				.000073	.003437
8				.000009	.000859
9				.000001	.000191
10					.000038
11					.000007
12					.000001

			$\bar{X}$		
x	3	4	5	6	7
0	.049787	.018316	.006738	.002479	.000912
1	.149361	.073263	.033690	.014873	006383
2	.224042	.146525	.084224	.044618	.022341
3	.224042	.195367	.140374	.089235	.052129
4	.168031	.195367	.175467	.133853	.091226
5	.100819	.156293	.175467	.160623	.127717
6	.050409	.104196	.146223	.160623	.149003
7	.021604	.059540	.104445	.137677	.149003
8	.008102	.029770	.065278	.103258	.130377
9	.002701	.013231	.036266	.068838	.101405
10	.000810	.005292	.018133	.041303	.070983
11	.000221	.001925	.008242	.022529	.045171
12	.000055	.000642	.003434	.011264	.026350
13	.000013	.000197	.001321	.005199	.014188
14	.000003	.000056	.000472	.002228	.007094
15	.000001	.000015	.000157	.000891	.003311
16		.000004	.000049	.000334	.001448
17		.000001	.000014	.000118	.000596
18			.000004	.000039	.000232
19			.000001	.000012	.000085
20				.000004	.000030
21				.000001	.000010
22					.000003
23					.000001

Source: Extracted from E. C. Molina, *Poisson's Exponential Binomial Limit* (New York: D. Van Nostrand Co., 1942). With the permission of the Bell Laboratories.

POISSON DISTRIBUTION

			λ		
x	8	9	10	11	12
0	.000335	.000123	.000045	.000017	.000006
1	.002684	.001111	.000454	.000184	.000074
2	.010735	.004998	.002270	.001010	.000442
3	.028626	.014994	.007567	.003705	.001770
4	.057252	.033737	.018917	.010189	.005309
5	.091604	.060727	.037833	.022415	.012741
6	.122138	.091090	.063055	.041095	.025481
7	.139587	.117116	.090079	.064577	.043682
8	.139587	.131756	.112599	.088794	.065523
9	.124077	.131756	.125110	.108526	.087364
10	.099262	.118580	.125110	.119378	.104837
11	.072190	.097020	.113736	.119378	.114368
12	.048127	.072765	.094780	.109430	.114368
13	.029616	.050376	.072908	.092595	.105570
14	.016924	.032384	.052077	.072753	.090489
15	.009026	.019431	.034718	.053352	.072391
16	.004513	.010930	.021699	.036680	.054293
17	.002124	.005786	.012764	.023734	.038325
18	.000944	.002893	.007091	.014504	.025550
19	.000397	.001370	.003732	.008397	.016137
20	.000159	.000617	.001866	.004618	.009682
21	.000061	.000264	.000889	.002419	.005533
22	.000022	.000108	.000404	.001210	.003018
23	.000008	.000042	.000176	.000578	.001574
24	.000003	.000016	.000073	.000265	.000787
25	.000001	.000006	.000029	.000117	.000378
26		.000002	.000011	.000049	.000174
27		.000001	.000004	.000020	.000078
28			.000001	.000008	.000033
29			.000001	.000003	.000014
30				.000001	.000005
31					.000002
32					.000001

			λ		
x	13	14	15	16	17
0	.000002	.000001			
1	.000029	.000012	.000005	.000002	.000001
2	.000191	.000081	.000034	.000014	.000006
3	.000828	.000380	.000172	.000077	.000034
4	.002690	.001331	.000645	.000307	.000144

POISSON DISTRIBUTION

			$\bar{X}$		
x	13	14	15	16	17
5	.006994	.003727	.001936	.000983	.000490
6	.015153	.008696	.004839	.002622	.001388
7	.028141	.017392	.010370	.005994	.003371
8	.045730	.030436	.019444	.011987	.007163
9	.066054	.047344	.032407	.021311	.013529
10	.085870	.066282	.048611	.034098	.023000
11	.101483	.084359	.066287	.049597	.035545
12	.109940	.098418	.082859	.066129	.050355
13	.109940	.105989	.095607	.081389	.065849
14	.102087	.105989	.102436	.093016	.079960
15	.088475	.098923	.102436	.099218	.090621
16	.071886	.086558	.096034	.099218	.096285
17	.054972	.071283	.084736	.093381	.096285
18	.039702	.055442	.070613	.083006	.090935
19	.027164	.040852	.055747	.069899	.081363
20	.017657	.028597	.041810	.055920	.069159
21	.010930	.019064	.029865	.042605	.055986
22	.006459	.012132	.020362	.030986	.043262
23	.003651	.007385	.013280	.021555	.031976
24	.001977	.004308	.008300	.014370	.022650
25	.001028	.002412	.004980	.009197	.015402
26	.000514	.001299	.002873	.005660	.010070
27	.000248	.000674	.001596	.003354	.006341
28	.000115	.000337	.000855	.001916	.003850
29	.000052	.000163	.000442	.001057	.002257
30	.000022	.000076	.000221	.000564	.001279
31	.000009	.000034	.000107	.000291	.000701
32	.000004	.000015	.000050	.000146	.000373
33	.000001	.000006	.000023	.000071	.000192
34	.000001	.000003	.000010	.000033	.000096
35		.000001	.000004	.000015	.000047
36			.000002	.000007	.000022
37			.000001	.000003	.000010
38				.000001	.000005
39				.000001	.000002
40					.000001

POISSON DISTRIBUTION

			$\bar{X}$		
x	18	19	20	21	22
1					
2	.000002	.000001			
3	.000015	.000006	.000003	.000001	
4	.000067	.000030	.000014	.000006	.000003
5	.000240	.000116	.000055	.000026	.000012
6	.000719	.000366	.000183	.000090	.000044
7	.001850	.000994	.000523	.000271	.000138
8	.004163	.002360	.001309	.000711	.000380
9	.008325	.004982	.002908	.001660	.000928
10	.014985	.009466	.005816	.003485	.002042
11	.024521	.016351	.010575	.006654	.004083
12	.036782	.025889	.017625	.011644	.007486
13	.050929	.037837	.027116	.018810	.012669
14	.065480	.051351	.038737	.028215	.019908
15	.078576	.065044	.051649	.039501	.029199
16	.088397	.077240	.064561	.051845	.040148
17	.093597	.086327	.075954	.064044	.051956
18	.093597	.091123	.084394	.074717	.063502
19	.088671	.091123	.088835	.082582	.073529
20	.079804	.086567	.088835	.086712	.080882
21	.068403	.078323	.084605	.086712	.084733
22	.055966	.067642	.076914	.082770	.084733
23	.043800	.055878	.066881	.075573	.081049
24	.032850	.044237	.055735	.066126	.074295
25	.023652	.033620	.044588	.055546	.065380
26	.016374	.024569	.034298	.044864	.055321
27	.010916	.017289	.025406	.034894	.045077
28	.007018	.011732	.018147	.026171	.035417
29	.004356	.007686	.012515	.018951	.026868
30	.002613	.004868	.008344	.013266	.019703
31	.001517	.002984	.005383	.008987	.013983
32	.000854	.001772	.003364	.005897	.009613
33	.000466	.001020	.002039	.003753	.006409
34	.000246	.000570	.001199	.002318	.004147
35	.000127	.000309	.000685	.001391	.002607
36	.000063	.000163	.000381	.000811	.001593
37	.000031	.000084	.000206	.000460	.000947
38	.000015	.000042	.000108	.000254	.000548
39	.000007	.000020	.000056	.000137	.000309
40	.000003	.000010	.000028	.000072	.000170
41	.000001	.000004	.000014	.000037	.000091
42	.000001	.000002	.000006	.000018	.000048
43		.000001	.000003	.000009	.000024
44			.000001	.000004	.000012
45			.000001	.000002	.000006
46				.000001	.000003
47					.000001
48					.000001

POISSON DISTRIBUTION

			$\bar{X}$		
x	23	24	25	30	35
4	.000001	.000001			
5	.000006	.000003	.000001		
6	.000021	.000010	.000005		
7	.000069	.000034	.000017		
8	.000199	.000103	.000053	.000002	
9	.000509	.000275	.000146	.000005	
10	.001171	.000660	.000365	.000015	
11	.002449	.001439	.000830	.000042	.000002
12	.004695	.002878	.001728	.000104	.000004
13	.008306	.005314	.003323	.000240	.000012
14	.013646	.009109	.005935	.000513	.000030
15	.020924	.014575	.009891	.001027	.000070
16	.030078	.021862	.015455	.001925	.000153
17	.040694	.030864	.022727	.003397	.000315
18	.051998	.041152	.031566	.005662	.000612
19	.062945	.051982	.041534	.008941	.001127
20	.072387	.062378	.051917	.013411	.001972
21	.079281	.071289	.061807	.019159	.003287
22	.082884	.077770	.070235	.026126	.005229
23	.082884	.081152	.076342	.034077	.007957
24	.079431	.081152	.079523	.042596	.011604
25	.073076	.077905	.079523	.051115	.016246
26	.064645	.071913	.076464	.058979	.021870
27	.055068	.063922	.070800	.065532	.028350
28	.045234	.054791	.063215	.070213	.035437
29	.035875	.045344	.054495	.072635	.042769
30	.027504	.036275	.045413	.072635	.049897
31	.020406	.028084	.036623	.070291	.056335
32	.014667	.021063	.028612	.065898	.061617
33	.010223	.015319	.021676	.059908	.065351
34	.006915	.010813	.015938	.052860	.067273
35	.004544	.007415	.011384	.045308	.067273
36	.002903	.004943	.007906	.037757	.065404
37	.001805	.003206	.005342	.030614	.061869
38	.001092	.002025	.003514	.024169	.056985
39	.000644	.001246	.002253	.018591	.051140
40	.000370	.000748	.001408	.013943	.044748
41	.000208	.000438	.000859	.010203	.038199
42	.000114	.000250	.000511	.007288	.031833
43	.000061	.000140	.000297	.005084	.025910
44	.000032	.000076	.000169	.003467	.020610

POISSON DISTRIBUTION

			X̄		
x	23	24	25	30	35
45	.000016	.000041	.000094	.002311	.016030
46	.000008	.000021	.000051	.001507	.012197
47	.000004	.000011	.000027	.000962	.009083
48	.000002	.000005	.000014	.000601	.006623
49	.000001	.000003	.000007	.000368	.004731
50		.000001	.000004	.000221	.003311
51		.000001	.000002	.000130	.002273
52			.000001	.000075	.001530
53				.000042	.001010
54				.000024	.000655
55				.000013	.000417
56				.000007	.000260
57				.000004	.000160
58				.000002	.000096
59				.000001	.000057
60					.000033
61					.000019
62					.000011
63					.000006
64					.000003
65					.000002
66					.000001

			X̄		
x	40	45	50	60	70
14	.000001				
15	.000003				
16	.000009				
17	.000021	.000001			
18	.000046	.000003			
19	.000096	.000006			
20	.000192	.000014	.000001		
21	.000366	.000029	.000002		
22	.000665	.000060	.000004		
23	.001156	.000117	.000009		
24	.001927	.000219	.000019		
25	.003084	.000395	.000037		
26	.004744	.000683	.000071		
27	.007028	.001139	.000132	.000001	
28	.010041	.001830	.000236	.000002	
29	.013849	.002840	.000406	.000004	
30	.018465	.004261	.000677	.000007	
31	.023826	.006185	.001092	.000014	
32	.029783	.008697	.001707	.000026	
33	.036101	.011860	.002586	.000048	
34	.042471	.015697	.003803	.000085	.000001

POISSON DISTRIBUTION

			$\bar{X}$		
x	40	45	50	60	70
35	.048539	.020182	.005432	.000146	.000001
36	.053932	.025227	.007545	.000243	.000003
37	.058305	.030681	.010196	.000394	.000005
38	.061373	.036333	.013416	.000622	.000010
39	.062947	.041923	.017200	.000956	.000018
40	.062947	.047163	.021500	.001435	.000031
41	.061412	.051765	.026219	.002099	.000053
42	.058487	.055462	.031213	.002999	.000088
43	.054407	.058042	.036294	.004185	.000144
44	.049461	.059361	.041244	.005707	.000229
45	.043965	.059361	.045826	.007609	.000356
46	.038231	.058070	.049811	.009925	.000541
47	.032537	.055599	.052991	.012670	.000806
48	.027114	.052124	.055199	.015837	.001175
49	.022134	.047869	.056325	.019393	.001679
50	.017707	.043082	.056325	.023271	.002351
51	.013888	.038014	.055221	.027378	.003227
52	.010683	.032897	.053097	.031590	.004343
53	.008063	.027931	.050091	.035762	.005737
54	.005972	.023276	.046381	.039736	.007436
55	.004343	.019044	.042164	.043348	.009465
56	.003102	.015303	.037647	.046444	.011831
57	.002177	.012081	.033023	.048889	.014529
58	.001502	.009374	.028468	.050575	.017535
59	.001018	.007149	.024126	.051432	.020804
60	.000679	.005362	.020105	.051432	.024271
61	.000445	.003956	.016479	.050589	.027852
62	.000287	.002871	.013290	.048957	.031446
63	.000182	.002051	.010547	.046625	.034940
64	.000114	.001442	.008240	.043711	.038216
65	.000070	.000998	.006339	.040349	.041156
66	.000042	.000681	.004802	.036681	.043650
67	.000025	.000457	.003584	.032849	.045604
68	.000015	.000303	.002635	.028984	.046946
69	.000009	.000197	.001909	.025203	.047626
70	.000005	.000127	.001364	.021603	.047626
71	.000003	.000080	.000960	.018256	.046955
72	.000002	.000050	.000667	.015213	.045651
73	.000001	.000031	.000457	.012504	.043775
74		.000019	.000309	.010138	.041409
75		.000011	.000206	.008111	.038648
76		.000007	.000135	.006403	.035597
77		.000004	.000088	.004990	.032361
78		.000002	.000056	.003838	.029042
79		.000001	.000036	.002915	.025733

POISSON DISTRIBUTION

			$\bar{X}$		
x	40	45	50	60	70
80		.000001	.000022	.002186	.022517
81			.000014	.001619	.019459
82			.000008	.001185	.016611
83			.000005	.000857	.014009
84			.000003	.000612	.011674
85			.000002	.000432	.009614
86			.000001	.000301	.007826
87			.000001	.000208	.006296
88				.000142	.005009
89				.000096	.003939
90				.000064	.003064
91				.000042	.002357
92				.000027	.001793
93				.000018	.001350
94				.000011	.001005
95				.000007	.000741
96				.000004	.000540
97				.000003	.000390
98				.000002	.000278
99				.000001	.000197
100				.000001	.000138
101					.000095
102					.000066
103					.000045
104					.000030
105					.000020
106					.000013
107					.000009
108					.000006
109					.000004
110					.000002
111					.000001
112					.000001
113					.000001

		X			
x	80	90	100		
40					
41	.000001				
42	.000001				
43	.000002				
44	.000004				
45	.000007				
46	.000011				
47	.000019				
48	.000032				
49	.000053	.000001			

POISSON DISTRIBUTION

		$\bar{X}$	
x	80	90	100
50	.000085	.000001	
51	.000133	.000002	
52	.000204	.000004	
53	.000309	.000007	
54	.000457	.000012	
55	.000665	.000020	
56	.000950	.000032	.000001
57	.001333	.000050	.000001
58	.001839	.000077	.000002
59	.002493	.000118	.000003
60	.003324	.000177	.000004
61	.004359	.000261	.000007
62	.005625	.000379	.000012
63	.007143	.000541	.000019
64	.008929	.000761	.000029
65	.010989	.001054	.000045
66	.013320	.001438	.000068
67	.015905	.001931	.000102
68	.018711	.002556	.000150
69	.021694	.003334	.000217
70	.024793	.004286	.000311
71	.027936	.005433	.000437
72	.031040	.006791	.000608
73	.034017	.008373	.000832
74	.036775	.010183	.001125
75	.039226	.012220	.001499
76	.041291	.014471	.001973
77	.042900	.016914	.002562
78	.044000	.019516	.003285
79	.044557	.022234	.004158
80	.044557	.025013	.005198
81	.044007	.027792	.006417
82	.042933	.030504	.007826
83	.041381	.033077	.009429
84	.039411	.035439	.011225
85	.037093	.037524	.013205
86	.034505	.039269	.015355
87	.031729	.040623	.017649
88	.028844	.041546	.020056
89	.025927	.042013	.022535
90	.023046	.042013	.025039
91	.020261	.041552	.027515
92	.017618	.040648	.029908
93	.015155	.039337	.032159
94	.012898	.037663	.034212

POISSON DISTRIBUTION

		$\bar{X}$	
x	80	90	100
95	.010862	.035681	.036012
96	.009051	.033451	.037513
97	.007465	.031037	.038673
98	.006094	.028503	.039462
99	.004924	.025912	.039861
100	.003939	.023321	.039861
101	.003120	.020781	.039466
102	.002447	.018336	.038692
103	.001901	.016022	.037566
104	.001462	.013865	.036121
105	.001114	.011884	.034401
106	.000841	.010090	.032453
107	.000629	.008487	.030330
108	.000466	.007073	.028084
109	.000342	.005840	.025765
110	.000249	.004778	.023423
111	.000179	.003874	.021101
112	.000128	.003113	.018841
113	.000091	.002479	.016673
114	.000064	.001957	.014625
115	.000044	.001532	.012718
116	.000030	.001189	.010964
117	.000021	.000914	.009371
118	.000014	.000697	.007941
119	.000010	.000527	.006673
120	.000006	.000396	.005561
121	.000004	.000294	.004596
122	.000003	.000217	.003767
123	.000002	.000159	.003063
124	.000001	.000115	.002470
125	.000001	.000083	.001976
126		.000059	.001568
127		.000042	.001235
128		.000030	.000965
129		.000021	.000748
130		.000014	.000575
131		.000010	.000439
132		.000007	.000333
133		.000005	.000250
134		.000003	.000187
135		.000002	.000138
136		.000001	.000102
137		.000001	.000074
138		.000001	.000054
139			.000039

	$\bar{X}$
x	100
140	.000028
141	.000020
142	.000014
143	.000010
144	.000007
145	.000005
146	.000003
147	.000002
148	.000001
149	.000001
150	.000001

TABLE 18. TABLE OF 3σ CONFIDENCE LIMITS FOR BINOMIAL DISTRIBUTION IN PER CENT FOR SAMPLE SIZES 100 TO 100,000 AND *p* OF .1% TO 40%

per cent	Upper control limit																	
	group size																	
	100	150	200	300	400	500	600	800	1,000	1,500	2,000	3,000	4,000	5,000	10,000	20,000	50,000	100,000
0.1	1.05	0.87	0.77	0.65	0.57	0.52	0.49	0.44	0.40	0.34	0.31	0.27	0.25	0.23	0.19	0.17	0.14	0.13
0.2	1.54	1.29	1.15	0.97	0.87	0.80	0.75	0.67	0.62	0.55	0.50	0.44	0.41	0.39	0.33	0.29	0.26	0.24
0.4	2.29	1.95	1.74	1.49	1.34	1.25	1.17	1.07	1.00	0.89	0.82	0.75	0.70	0.67	0.59	0.53	0.48	0.46
0.6	2.92	2.49	2.24	1.94	1.76	1.64	1.55	1.42	1.33	1.20	1.12	1.02	0.97	0.93	0.83	0.76	0.70	0.67
0.8	3.47	2.98	2.69	2.34	2.14	2.00	1.89	1.75	1.65	1.49	1.40	1.29	1.22	1.18	1.07	0.99	0.92	0.88
1.0	4.00	3.44	3.11	2.72	2.49	2.33	2.22	2.06	1.94	1.77	1.67	1.55	1.47	1.42	1.30	1.21	1.13	1.09
1.2	4.47	3.87	3.51	3.09	2.83	2.66	2.53	2.35	2.23	2.04	1.93	1.80	1.72	1.66	1.53	1.43	1.35	1.30
1.4	4.92	4.28	3.89	3.43	3.16	2.98	2.84	2.65	2.51	2.31	2.19	2.04	1.96	1.90	1.75	1.65	1.56	1.51
1.6	5.36	4.70	4.26	3.77	3.48	3.28	3.14	2.93	2.79	2.57	2.44	2.29	2.20	2.13	1.98	1.87	1.77	1.72
1.8	5.79	5.05	4.62	4.10	3.79	3.58	3.43	3.21	3.06	2.83	2.69	2.53	2.43	2.36	2.20	2.08	1.98	1.93
2.0	6.20	5.43	4.97	4.42	4.10	3.88	3.71	3.49	3.33	3.08	2.94	2.77	2.66	2.59	2.42	2.30	2.19	2.13
2.5	7.18	6.32	5.81	5.20	4.84	4.59	4.41	4.16	3.98	3.71	3.55	3.36	3.24	3.16	2.97	2.83	2.71	2.65
3.0	8.12	7.18	6.62	5.95	5.56	5.29	5.09	4.81	4.62	4.32	4.14	3.93	3.81	3.72	3.51	3.36	3.23	3.16
3.5	9.01	8.03	7.49	6.68	6.26	5.97	5.75	5.45	5.24	4.92	4.73	4.51	4.37	4.28	4.05	3.89	3.75	3.67
4.0	9.58	8.80	8.16	7.39	6.94	6.63	6.40	6.08	5.86	5.52	5.31	5.07	4.93	4.83	4.59	4.42	4.26	4.19
5	11.54	10.34	9.62	8.77	8.27	7.92	7.67	7.31	7.07	6.69	6.46	6.19	6.03	5.92	5.65	5.46	5.29	5.21
6	13.13	11.82	11.04	10.11	9.56	9.19	8.91	8.52	8.25	7.84	7.59	7.30	7.13	7.01	6.71	6.50	6.32	6.23
7	14.65	13.25	12.41	11.42	10.83	10.42	10.12	9.71	9.42	8.98	8.71	8.40	8.21	8.08	7.76	7.54	7.34	7.24
8	16.14	14.64	13.76	12.70	12.07	11.64	11.32	10.88	10.57	10.10	9.82	9.49	9.29	9.15	8.81	8.58	8.36	8.26
9	17.49	15.93	15.00	13.90	13.24	12.80	12.46	12.00	11.68	11.22	10.90	10.55	10.34	10.20	9.85	9.60	9.38	9.27
10	19.00	17.25	16.36	15.20	14.50	14.02	13.67	13.18	12.85	12.32	12.01	11.64	11.42	11.27	10.90	10.64	10.40	10.28
12	21.75	19.96	18.89	17.63	16.87	16.36	15.98	15.45	15.08	14.52	14.18	13.78	13.54	13.38	12.97	12.69	12.44	12.31
14	24.41	22.50	21.36	20.01	19.20	18.66	18.25	17.68	17.29	16.69	16.33	15.90	15.65	15.47	15.04	14.74	14.47	14.33
16	26.96	24.95	23.75	22.33	21.48	20.90	20.47	19.87	19.47	18.83	18.45	18.00	17.73	17.55	17.10	16.77	16.49	16.35
18	29.53	27.41	26.15	24.65	23.76	23.15	22.71	22.07	21.64	20.97	20.58	20.10	19.82	19.63	19.15	18.81	18.52	18.36
20	32.00	29.80	28.49	26.93	26.00	25.37	24.90	24.24	23.79	23.10	22.68	22.19	21.90	21.70	21.20	20.85	20.54	20.38
25	37.99	35.61	34.19	32.50	31.50	30.81	30.30	29.59	29.11	28.35	27.90	27.37	27.05	26.84	26.30	25.92	25.58	25.41
30	43.75	41.23	39.72	37.94	36.82	36.15	35.61	34.86	34.35	33.55	33.07	32.51	32.17	31.94	31.37	30.97	30.61	30.43
35	49.31	46.68	45.12	43.26	42.15	41.40	40.84	40.06	39.52	38.70	38.20	37.61	37.26	37.02	36.43	36.01	35.64	35.45
40	54.70	52.00	50.39	48.49	47.35	46.57	46.00	45.20	44.65	43.79	43.28	42.68	42.32	42.08	41.47	41.04	40.66	40.46

Source: E. L. Grant, *Statistical Quality Control* (New York: McGraw-Hill Co., 1946). By permission of the publishers.

3σ CONFIDENCE LIMITS

per cent	Lower control limit																	
	group size																	
	100	150	200	300	400	500	600	800	1,000	1,500	2,000	3,000	4,000	5,000	10,000	20,000	50,000	100,000
0.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.06	0.07
0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.07	0.11	0.14	0.16
0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.10	0.13	0.21	0.27	0.32	0.34
0.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.18	0.23	0.27	0.37	0.44	0.50	0.53
0.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.20	0.31	0.38	0.42	0.53	0.61	0.68	0.72
1.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.23	0.33	0.45	0.53	0.58	0.70	0.79	0.87	0.91
1.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.17	0.36	0.47	0.60	0.68	0.74	0.87	0.97	1.05	1.10
1.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.29	0.49	0.61	0.76	0.84	0.90	1.05	1.15	1.24	1.29
1.6	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.27	0.41	0.63	0.76	0.91	1.00	1.07	1.22	1.33	1.43	1.48
1.8	0.00	0.00	0.00	0.00	0.00	0.02	0.17	0.39	0.54	0.77	0.91	1.07	1.17	1.24	1.40	1.52	1.62	1.67
2.0	0.00	0.00	0.00	0.00	0.00	0.12	0.29	0.51	0.67	0.92	1.06	1.23	1.34	1.41	1.58	1.70	1.81	1.87
2.5	0.00	0.00	0.00	0.00	0.16	0.41	0.59	0.84	1.02	1.29	1.45	1.64	1.76	1.84	2.03	2.17	2.29	2.35
3.0	0.00	0.00	0.00	0.05	0.44	0.71	0.91	1.19	1.38	1.68	1.86	2.07	2.19	2.28	2.49	2.64	2.77	2.84
3.5	0.00	0.00	0.00	0.32	0.74	1.03	1.25	1.55	1.76	2.08	2.27	2.49	2.63	2.72	2.95	3.11	3.25	3.33
4.0	0.00	0.00	0.00	0.61	1.06	1.37	1.60	1.92	2.14	2.48	2.69	2.93	3.07	3.17	3.41	3.58	3.74	3.81
5	0.00	0.00	0.38	1.23	1.73	2.08	2.33	2.69	2.93	3.31	3.54	3.81	3.97	4.08	4.35	4.54	4.71	4.79
6	0.00	0.18	0.96	1.89	2.44	2.81	3.09	3.48	3.75	4.16	4.41	4.70	4.87	4.99	5.29	5.50	5.68	5.77
7	0.00	0.75	1.59	2.58	3.17	3.58	3.88	4.29	4.58	5.02	5.29	5.60	5.79	5.92	6.24	6.46	6.66	6.76
8	0.00	1.36	2.24	3.30	3.93	4.36	4.68	5.12	5.43	5.90	6.18	6.51	6.71	6.85	7.19	7.42	7.64	7.74
9	0.51	2.07	3.00	4.10	4.76	5.20	5.54	6.00	6.32	6.78	7.10	7.45	7.66	7.80	8.15	8.40	8.62	8.73
10	1.00	2.75	3.64	4.80	5.50	5.98	6.33	6.82	7.15	7.68	7.99	8.36	8.58	8.73	9.10	9.36	9.60	9.72
12	2.25	4.04	5.11	6.37	7.13	7.64	8.02	8.55	8.92	9.48	9.82	10.22	10.46	10.62	11.03	11.31	11.56	11.69
14	3.59	5.50	6.64	7.99	8.80	9.34	9.75	10.32	10.71	11.31	11.67	12.10	12.35	12.53	12.96	13.26	13.53	13.67
16	5.04	7.05	8.25	9.67	10.52	11.10	11.53	12.13	12.53	13.17	13.55	14.00	14.27	14.45	14.90	15.23	15.51	15.65
18	6.47	8.59	9.85	11.35	12.24	12.85	13.29	13.93	14.36	15.03	15.42	15.90	16.18	16.37	16.85	17.19	17.48	17.64
20	8.00	10.20	11.51	13.07	14.00	14.63	15.10	15.76	16.21	16.90	17.32	17.81	18.10	18.30	18.80	19.15	19.46	19.62
25	12.01	14.39	15.81	17.50	18.50	19.19	19.70	20.41	20.89	21.65	22.10	22.63	22.95	23.16	23.70	24.08	24.42	24.59
30	16.25	18.77	20.28	22.06	23.18	23.85	24.39	25.14	25.65	26.45	26.93	27.49	27.83	28.06	28.63	29.03	29.39	29.57
35	20.69	23.32	24.88	26.74	27.85	28.60	29.16	29.94	30.48	31.30	31.80	32.39	32.74	32.98	33.57	33.99	34.36	34.55
40	25.30	28.00	29.61	31.51	32.65	33.43	34.00	34.80	35.35	36.21	36.72	37.32	37.68	37.92	38.53	38.96	39.34	39.54

TABLE 19. TABLE OF SAMPLE SIZE REQUIRED FOR FINITE POPULATIONS, FOR CONFIDENCE LIMITS AND SPECIFIED RELIABILITY LIMITS IN SAMPLING ATTRIBUTES IN PER CENT

A. 95% Confidence Interval
(p = .5)*

Number of Occupied D.U.'s in Area	Sample Size for Reliability of					
	±1%	±2%	±3%	±4%	±5%	±10%
500	**	**	**	**	222	83
1,000	**	**	**	385	286	91
1,500	**	**	638	441	316	94
2,000	**	**	714	476	333	95
2,500	**	1,250	769	500	345	96
3,000	**	1,364	811	517	353	97
3,500	**	1,458	843	530	359	97
4,000	**	1,538	870	541	364	98
4,500	**	1,607	891	549	367	98
5,000	**	1,667	909	556	370	98
6,000	**	1,765	938	566	375	98
7,000	**	1,842	959	574	378	99
8,000	**	1,905	976	580	381	99
9,000	**	1,957	989	584	383	99
10,000	5,000	2,000	1,000	588	385	99
15,000	6,000	2,143	1,034	600	390	99
20,000	6,667	2,222	1,053	606	392	100
25,000	7,143	2,273	1,064	610	394	100
50,000	8,333	2,381	1,087	617	397	100
100,000	9,091	2,439	1,099	621	398	100
→ ∞	10,000	2,500	1,111	625	400	100

* *p - Proportion of units in sample possessing characteristic being measured; for other values of p. the required sample size will be smaller.*

** *In these cases 50% of the universe in the sample will give more than the required accuracy. Since the normal distribution is a poor approximation of the hypergeometrical distribution when n is more than 50% of N, the formula used in this calculation does not apply.*

Source: Section A: Reproduced by permission from *A Method for Employing Sampling Techniques in Housing Surveys* (New York: New York State Division of Housing, September, 1948). Section B: Compiled by William Wolman, Bureau of Research, New York State Division of Housing.

SAMPLE SIZE

B. 99.7% Confidence Interval
(p = .5)*

Number in Population	Sample Size for Reliability of				
	±1%	±2%	±3%	±4%	±5%
500	**	**	**	**	**
1,000	**	**	**	**	474
1,500	**	**	**	726	563
2,000	**	**	**	826	621
2,500	**	**	**	900	662
3,000	**	**	1,364	958	692
3,500	**	**	1,458	1,003	716
4,000	**	**	1,539	1,041	735
4,500	**	**	1,607	1,071	750
5,000	**	**	1,667	1,098	763
6,000	**	2,903	1,765	1,139	783
7,000	**	3,119	1,842	1,171	798
8,000	**	3,303	1,905	1,196	809
9,000	**	3,462	1,957	1,216	818
10,000	**	3,600	2,000	1,233	826
15,000	**	4,091	2,143	1,286	849
20,000	**	4,390	2,222	1,314	861
25,000	11,842	4,592	2,273	1,331	869
50,000	15,517	5,056	2,381	1,368	884
100,000	18,367	5,325	2,439	1,387	892
→ ∞	22,500	5,625	2,500	1,406	900

* *p - Proportion of units in sample possessing characteristic being measured; for other values of p, the required sample size will be smaller.*

** *In these cases 50% of the universe in the sample will give more than the required accuracy. Since the normal distribution is a poor approximation of the hypergeometrical distribution when n is more than 50% of N, the formula used in this calculation does not apply.*

TABLE 20. TABLE OF FUNCTIONS OF r

r	$\sqrt{r}$	r^2	$\sqrt{r-r^2}$	$\sqrt{1-r}$	$1-r^2$	$\sqrt{1-r^2}$	$100(1-k)$	r
			$\sigma_{\infty \cdot 1}$	$\sigma_{(M)}$		k	% Eff.	
1.00	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	100.00	1.00
.99	.9950	.9801	.0995	.1000	.0199	.1411	85.89	.99
.98	.9899	.9604	.1400	.1414	.0396	.1990	80.10	.98
.97	.9849	.9409	.1706	.1732	.0591	.2431	75.69	.97
.96	.9798	.9216	.1960	.2000	.0784	.2800	72.00	.96
.95	.9747	.9025	.2179	.2236	.0975	.3122	68.78	.95
.94	.9695	.8836	.2375	.2449	.1164	.3412	65.88	.94
.93	.9644	.8649	.2551	.2646	.1351	.3676	63.24	.93
.92	.9592	.8464	.2713	.2828	.1536	.3919	60.81	.92
.91	.9539	.8281	.2862	.3000	.1719	.4146	58.54	.91
.90	.9487	.8100	.3000	.3162	.1900	.4359	56.41	.90
.89	.9434	.7921	.3129	.3317	.2079	.4560	54.40	.89
.88	.9381	.7744	.3250	.3464	.2256	.4750	52.50	.88
.87	.9327	.7569	.3363	.3606	.2431	.4931	50.69	.87
.86	.9274	.7396	.3470	.3742	.2604	.5103	48.97	.86
.85	.9220	.7225	.3571	.3873	.2775	.5268	47.32	.85
.84	.9165	.7056	.3666	.4000	.2944	.5426	45.74	.84
.83	.9110	.6889	.3756	.4123	.3111	.5578	44.22	.83
.82	.9055	.6724	.3842	.4243	.3276	.5724	42.76	.82
.81	.9000	.6561	.3923	.4359	.3439	.5864	41.36	.81
.80	.8944	.6400	.4000	.4472	.3600	.6000	40.00	.80
.79	.8888	.6241	.4073	.4583	.3759	.6131	38.69	.79
.78	.8832	.6084	.4142	.4690	.3916	.6258	37.42	.78
.77	.8775	.5929	.4208	.4796	.4071	.6380	36.20	.77
.76	.8718	.5776	.4271	.4899	.4224	.6499	35.01	.76
.75	.8660	.5625	.4330	.5000	.4375	.6614	33.86	.75
.74	.8602	.5476	.4386	.5099	.4524	.6726	32.74	.74
.73	.8544	.5329	.4440	.5196	.4671	.6834	31.66	.73
.72	.8485	.5184	.4490	.5292	.4816	.6940	30.60	.72
.71	.8426	.5041	.4538	.5385	.4959	.7042	29.58	.71
.70	.8367	.4900	.4583	.5477	.5100	.7141	28.59	.70
.69	.8307	.4761	.4625	.5568	.5239	.7238	27.62	.69
.68	.8246	.4624	.4665	.5657	.5376	.7332	26.68	.68
.67	.8185	.4489	.4702	.5745	.5511	.7424	25.76	.67
.66	.8124	.4356	.4737	.5831	.5644	.7513	24.87	.66
.65	.8062	.4225	.4770	.5916	.5775	.7599	24.01	.65
.64	.8000	.4096	.4800	.6000	.5904	.7684	23.16	.64
.63	.7937	.3969	.4828	.6083	.6031	.7766	22.34	.63
.62	.7874	.3844	.4854	.6164	.6156	.7846	21.54	.62
.61	.7810	.3721	.4877	.6245	.6279	.7924	20.76	.61
.60	.7746	.3600	.4899	.6325	.6400	.8000	20.00	.60
.59	.7681	.3481	.4918	.6403	.6519	.8074	19.26	.59
.58	.7616	.3364	.4936	.6481	.6636	.8146	18.54	.58
.57	.7550	.3249	.4951	.6557	.6751	.8216	17.84	.57
.56	.7483	.3136	.4964	.6633	.6864	.8285	17.15	.56
.55	.7416	.3025	.4975	.6708	.6975	.8352	16.48	.55
.54	.7348	.2916	.4984	.6782	.7084	.8417	15.83	.54
.53	.7280	.2809	.4991	.6856	.7191	.8480	15.20	.53
.52	.7211	.2704	.4996	.6928	.7296	.8542	14.58	.52
.51	.7141	.2601	.4999	.7000	.7399	.8602	13.98	.51
.50	.7071	.2500	.5000	.7071	.7500	.8660	13.40	.50

Source: Reproduced from W. V. Bingham, *Aptitudes and Aptitude Testing* (New York: Harper & Bros., 1937), Table XVII.

FUNCTIONS OF r

r	$\sqrt{r}$	r^2	$\sqrt{r - r^2}$	$\sqrt{1 - r}$	$1 - r^2$	$\sqrt{1 - r^2}$	$100(1 - k)$	r
			$\sigma_{\infty \cdot 1}$	$\sigma_{(M)}$		k	% Eff.	
.50	.7071	.2500	.5000	.7071	.7500	.8660	13.40	.50
.49	.7000	.2401	.4999	.7141	.7599	.8717	12.83	.49
.48	.6928	.2304	.4996	.7211	.7696	.8773	12.27	.48
.47	.6856	.2209	.4991	.7280	.7791	.8827	11.73	.47
.46	.6782	.2116	.4984	.7348	.7884	.8879	11.21	.46
.45	.6708	.2025	.4975	.7416	.7975	.8930	10.70	.45
.44	.6633	.1936	.4964	.7483	.8064	.8980	10.20	.44
.43	.6557	.1849	.4951	.7550	.8151	.9028	9.72	.43
.42	.6481	.1764	.4936	.7616	.8236	.9075	9.25	.42
.41	.6403	.1681	.4918	.7681	.8319	.9121	8.79	.41
.40	.6325	.1600	.4899	.7746	.8400	.9165	8.35	.40
.39	.6245	.1521	.4877	.7810	.8479	.9208	7.92	.39
.38	.6164	.1444	.4854	.7874	.8556	.9250	7.50	.38
.37	.6083	.1369	.4828	.7937	.8631	.9290	7.10	.37
.36	.6000	.1296	.4800	.8000	.8704	.9330	6.70	.36
.35	.5916	.1225	.4770	.8062	.8775	.9367	6.33	.35
.34	.5831	.1156	.4737	.8124	.8844	.9404	5.96	.34
.33	.5745	.1089	.4702	.8185	.8911	.9440	5.60	.33
.32	.5657	.1024	.4665	.8246	.8976	.9474	5.25	.32
.31	.5568	.0961	.4625	.8307	.9039	.9507	4.93	.31
.30	.5477	.0900	.4583	.8367	.9100	.9539	4.61	.30
.29	.5385	.0841	.4538	.8426	.9159	.9570	4.30	.29
.28	.5292	.0784	.4490	.8485	.9216	.9600	4.00	.28
.27	.5196	.0729	.4440	.8544	.9271	.9629	3.71	.27
.26	.5099	.0676	.4386	.8602	.9324	.9656	3.44	.26
.25	.5000	.0625	.4330	.8660	.9375	.9682	3.18	.25
.24	.4899	.0576	.4271	.8718	.9424	.9708	2.92	.24
.23	.4796	.0529	.4208	.8775	.9471	.9732	2.68	.23
.22	.4690	.0484	.4142	.8832	.9516	.9755	2.45	.22
.21	.4583	.0441	.4073	.8888	.9559	.9777	2.23	.21
.20	.4472	.0400	.4000	.8944	.9600	.9798	2.02	.20
.19	.4359	.0361	.3923	.9000	.9639	.9818	1.82	.19
.18	.4243	.0324	.3842	.9055	.9676	.9837	1.63	.18
.17	.4123	.0289	.3756	.9110	.9711	.9854	1.46	.17
.16	.4000	.0256	.3666	.9165	.9744	.9871	1.29	.16
.15	.3873	.0225	.3571	.9220	.9775	.9887	1.13	.15
.14	.3742	.0196	.3470	.9274	.9804	.9902	.98	.14
.13	.3606	.0169	.3363	.9327	.9831	.9915	.85	.13
.12	.3464	.0144	.3250	.9381	.9856	.9928	.72	.12
.11	.3317	.0121	.3129	.9434	.9879	.9939	.61	.11
.10	.3162	.0100	.3000	.9487	.9900	.9950	.50	.10
.09	.3000	.0081	.2862	.9539	.9919	.9959	.41	.09
.08	.2828	.0064	.2713	.9592	.9936	.9968	.32	.08
.07	.2646	.0049	.2551	.9644	.9951	.9975	.25	.07
.06	.2449	.0036	.2375	.9695	.9964	.9982	.18	.06
.05	.2236	.0025	.2179	.9747	.9975	.9987	.13	.05
.04	.2000	.0016	.1960	.9798	.9984	.9992	.08	.04
.03	.1732	.0009	.1706	.9849	.9991	.9995	.05	.03
.02	.1414	.0004	.1400	.9899	.9996	.9998	.02	.02
.01	.1000	.0001	.0995	.9950	.9999	.9999	.01	.01
.00	.0000	.0000	.0000	1.0000	1.0000	1.0000	.00	.00

TABLE 21. TABLE OF 5% AND 1% POINTS FOR *r* AND *R*

Degrees of Freedom	Number of Variables			
	2	3	4	5
1	.997 **1.000**	.999 **1.000**	.999 **1.000**	.999 **1.000**
2	.950 **.990**	.975 **.995**	.983 **.997**	.987 **.998**
3	.878 **.959**	.930 **.976**	.950 **.983**	.961 **.987**
4	.811 **.917**	.881 **.949**	.912 **.962**	.930 **.970**
5	.754 **.874**	.836 **.917**	.874 **.937**	.898 **.949**
6	.707 **.834**	.795 **.886**	.839 **.911**	.867 **.927**
7	.666 **.798**	.758 **.855**	.807 **.885**	.838 **.904**
8	.632 **.765**	.726 **.827**	.777 **.860**	.811 **.882**
9	.602 **.735**	.697 **.800**	.750 **.836**	.786 **.861**
10	.576 **.708**	.671 **.776**	.726 **.814**	.763 **.840**
11	.553 **.684**	.648 **.753**	.703 **.793**	.741 **.821**
12	.532 **.661**	.627 **.732**	.683 **.773**	.722 **.802**
13	.514 **.641**	.608 **.712**	.664 **.755**	.703 **.785**
14	.497 **.623**	.590 **.694**	.646 **.737**	.686 **.768**
15	.482 **.606**	.574 **.677**	.630 **.721**	.670 **.752**
16	.468 **.590**	.559 **.662**	.615 **.706**	.655 **.738**
17	.456 **.575**	.545 **.647**	.601 **.691**	.641 **.724**
18	.444 **.561**	.532 **.633**	.587 **.678**	.628 **.710**
19	.433 **.549**	.520 **.620**	.575 **.665**	.615 **.698**
20	.423 **.537**	.509 **.608**	.563 **.652**	.604 **.685**
21	.413 **.526**	.498 **.596**	.552 **.641**	.592 **.674**
22	.404 **.515**	.488 **.585**	.542 **.630**	.582 **.663**
23	.396 **.505**	.479 **.574**	.532 **.619**	.572 **.652**
24	.388 **.496**	.470 **.565**	.523 **.609**	.562 **.642**
25	.381 **.487**	.462 **.555**	.514 **.600**	.553 **.633**
26	.374 **.478**	.454 **.546**	.506 **.590**	.545 **.624**
27	.367 **.470**	.446 **.538**	.498 **.582**	.536 **.615**
28	.361 **.463**	.439 **.530**	.490 **.573**	.529 **.606**
29	.355 **.456**	.432 **.522**	.482 **.565**	.521 **.598**
30	.349 **.449**	.426 **.514**	.476 **.558**	.514 **.591**
35	.325 **.418**	.397 **.481**	.445 **.523**	.482 **.556**
40	.304 **.393**	.373 **.454**	.419 **.494**	.455 **.526**
45	.288 **.372**	.353 **.430**	.397 **.470**	.432 **.501**
50	.273 **.354**	.336 **.410**	.379 **.449**	.412 **.479**
60	.250 **.325**	.308 **.377**	.348 **.414**	.380 **.442**
70	.232 **.302**	.286 **.351**	.324 **.386**	.354 **.413**
80	.217 **.283**	.269 **.330**	.304 **.362**	.332 **.389**
90	.205 **.267**	.254 **.312**	.288 **.343**	.315 **.368**
100	.195 **.254**	.241 **.297**	.274 **.327**	.300 **.351**
125	.174 **.228**	.216 **.266**	.246 **.294**	.269 **.316**
150	.159 **.208**	.198 **.244**	.225 **.270**	.247 **.290**
200	.138 **.181**	.172 **.212**	.196 **.234**	.215 **.253**
300	.113 **.148**	.141 **.174**	.160 **.192**	.176 **.208**
400	.098 **.128**	.122 **.151**	.139 **.167**	.153 **.180**
500	.088 **.115**	.109 **.135**	.124 **.150**	.137 **.162**
1000	.062 **.081**	.077 **.096**	.088 **.106**	.097 **.115**

Source: Reproduced from George W. Snedecor, *Statistical Methods* (Ames, Iowa: Iowa State College Press, 1946), p. 351. By permission of the author.

TABLE 22. TABLE OF PROBABILITY OF OCCURRENCE OF STATISTICAL DEVIATIONS OF DIFFERENT MAGNITUDES RELATIVE TO THE STANDARD ERROR

Number of Standard Errors	Probability of occurence of deviation as great as or greater than designated number of Standard Errors	Odds against the occurrence of a deviation as great as or greater than the designated number of Standard Errors
0.67449	50.00%	1.00 to 1
0.7	48.39	1.07 to 1
0.8	42.37	1.36 to 1
0.9	36.81	1.72 to 1
1.0	31.73	2.15 to 1
1.1	27.13	2.69 to 1
1.2	23.01	3.35 to 1
1.3	19.36	4.17 to 1
1.4	16.15	5.19 to 1
1.5	13.36	6.48 to 1
1.6	10.96	8.12 to 1
1.7	8.91	10.22 to 1
1.8	7.19	12.92 to 1
1.9	5.74	16.41 to 1
2.0	4.55	20.98 to 1
2.1	3.57	26.99 to 1
2.2	2.78	34.96 to 1
2.3	2.14	45.62 to 1
2.4	1.64	60.00 to 1
2.5	1.24	79.52 to 1
2.6	.932	106.3 to 1
2.7	.693	143.2 to 1
2.8	.511	194.7 to 1
2.9	.373	267.0 to 1
3.0	.270	369.4 to 1
3.1	.194	515.7 to 1
3.2	.137	726.7 to 1
3.3	.0967	1,033 to 1
3.4	.0674	1,483 to 1
3.5	.0465	2,149 to 1
3.6	.0318	3,142 to 1
3.7	.0216	4,637 to 1
3.8	.0145	6,915 to 1
3.9	.00962	10,390 to 1
4.0	.00634	15,770 to 1
5.0	.0000573	1,744,000 to 1
6.0	.00000020	500,000,000 to 1
7.0	.0000000026	400,000,000,000 to 1

Source: Reproduced from Herbert Arkin and Raymond R. Colton, *An Outline of Statistical Methods* (4th ed.: New York: Barnes & Noble, 1939), p. 118, as given by Raymond Pearl in *Medical Biometry and Statistics* (Philadelphia: W. B. Saunders Co., 1930).

TABLE 23. TABLE OF RANDOM NUMBERS (8,000 NUMBERS)

First Thousand

	1–4	*5–8*	*9–12*	*13–16*	*17–20*	*21–24*	*25–28*	*29–32*	*33–36*	*37–40*
1	23 15	75 48	59 01	83 72	59 93	76 24	97 08	86 95	23 03	67 44
2	05 54	55 50	43 10	53 74	35 08	90 61	18 37	44 10	96 22	13 43
3	14 87	16 03	50 32	40 43	62 23	50 05	10 03	22 11	54 38	08 34
4	38 97	67 49	51 94	05 17	58 53	78 80	59 01	94 32	42 87	16 95
5	97 31	26 17	18 99	75 53	08 70	94 25	12 58	41 54	88 21	05 13
6	11 74	26 93	81 44	33 93	08 72	32 79	73 31	18 22	64 70	68 50
7	43 36	12 88	59 11	01 64	56 23	93 00	90 04	99 43	64 07	40 36
8	93 80	62 04	78 38	26 80	44 91	55 75	11 89	32 58	47 55	25 71
9	49 54	01 31	81 08	42 98	41 87	69 53	82 96	61 77	73 80	95 27
10	36 76	87 26	33 37	94 82	15 69	41 95	96 86	70 45	27 48	38 80
11	07 09	25 23	92 24	62 71	26 07	06 55	84 53	44 67	33 84	53 20
12	43 31	00 10	81 44	86 38	03 07	52 55	51 61	48 89	74 29	46 47
13	61 57	00 63	60 06	17 36	37 75	63 14	89 51	23 35	01 74	69 93
14	31 35	28 37	99 10	77 91	89 41	31 57	97 64	48 62	58 48	69 19
15	57 04	88 65	26 27	79 59	36 82	90 52	95 65	46 35	06 53	22 54
16	09 24	34 42	00 68	72 10	71 37	30 72	97 57	56 09	29 82	76 50
17	97 95	53 50	18 40	89 48	83 29	52 23	08 25	21 22	53 26	15 87
18	93 73	25 95	70 43	78 19	88 85	56 67	16 68	26 95	99 64	45 69
19	72 62	11 12	25 00	92 26	82 64	35 66	65 94	34 71	68 75	18 67
20	61 02	07 44	18 45	37 12	07 94	95 91	73 78	66 99	53 61	93 78
21	97 83	98 54	74 33	05 59	17 18	45 47	35 41	44 22	03 42	30 00
22	89 16	09 71	92 22	23 29	06 37	35 05	54 54	89 88	43 81	63 61
23	25 96	68 82	20 62	87 17	92 65	02 82	35 28	62 84	91 95	48 83
24	81 44	33 17	19 05	04 95	48 06	74 69	00 75	67 65	01 71	65 45
25	11 32	25 49	31 42	36 23	43 86	08 62	49 76	67 42	24 52	32 45

Second Thousand

	1–4	*5–8*	*9–12*	*13–16*	*17–20*	*21–24*	*25–28*	*29–32*	*33–36*	*37–40*
1	64 75	58 38	85 84	12 22	59 20	17 69	61 56	55 95	04 59	59 47
2	10 30	25 22	89 77	43 63	44 30	38 11	24 90	67 07	34 82	33 28
3	71 01	79 84	95 51	30 85	03 74	66 59	10 28	87 53	76 56	91 49
4	60 01	25 56	05 88	41 03	48 79	79 65	59 01	69 78	80 00	36 66
5	37 33	09 46	56 49	16 14	28 02	48 27	45 47	55 44	55 36	50 96
6	47 86	98 70	01 31	59 11	22 73	60 62	61 28	22 34	69 16	12 12
7	38 04	04 27	37 64	16 78	95 78	39 32	34 93	24 88	43 43	87 06
8	73 50	83 09	08 83	05 48	00 78	36 66	93 02	95 56	46 04	53 36
9	32 62	34 64	74 84	06 10	43 24	20 62	83 73	19 32	35 64	39 69
10	97 59	19 95	49 36	63 03	51 06	62 06	99 29	75 95	32 05	77 34
11	74 01	23 19	55 59	79 09	69 82	66 22	42 40	15 96	74 90	75 89
12	56 75	42 64	57 13	35 10	50 14	90 96	63 36	74 69	09 63	34 88
13	49 80	04 99	08 54	83 12	19 98	08 52	82 63	72 92	92 36	50 26
14	43 58	48 96	47 24	87 85	66 70	00 22	15 01	93 99	59 16	23 77
15	16 65	37 96	64 60	32 57	13 01	35 74	28 36	36 73	05 88	72 29
16	48 50	26 90	55 65	32 25	87 48	31 44	68 02	37 31	25 29	63 67
17	96 76	55 46	92 36	31 68	62 30	48 29	63 83	52 23	81 66	40 94
18	38 92	36 15	50 80	35 78	17 84	23 44	41 24	63 33	99 22	81 28
19	77 95	88 16	94 25	22 50	55 87	51 07	30 10	70 60	21 86	19 61
20	17 92	82 80	65 25	58 60	87 71	02 64	18 50	64 65	79 64	81 70
21	94 03	68 59	78 02	31 80	44 99	41 05	41 05	31 87	43 12	15 96
22	47 46	06 04	79 56	23 04	84 17	14 37	28 51	67 27	55 80	03 68
23	47 85	65 60	88 51	99 28	24 39	40 64	41 71	70 13	46 31	82 88
24	57 61	63 46	53 92	29 86	20 18	10 37	57 65	15 62	98 69	07 56
25	08 30	09 27	04 66	75 26	66 10	57 18	87 91	07 54	22 22	20 13

Source: Reproduced from M. G. Kendall and B. B. Smith, ***Tables of Random Sampling Numbers***, Tracts for Computers XXIV (London: Cambridge University Press, 1939), pp. 2–5. By permission of the Biometrika Trustees and the Department of Statistics, Univeristy College, London.

RANDOM NUMBERS

Third Thousand

	1–4	5–8	9–12	13–16	17–20	21–24	25–28	29–32	33–36	37–40
1	89 22	10 23	62 65	78 77	47 33	51 27	23 02	13 92	44 13	96 51
2	04 00	59 98	18 63	91 82	90 32	94 01	24 23	63 01	26 11	06 50
3	98 54	63 80	66 50	85 67	50 45	40 64	52 28	41 53	25 44	41 25
4	41 71	98 44	01 59	22 60	13 14	54 58	14 03	98 49	98 86	55 79
5	28 73	37 24	89 00	78 52	58 43	24 61	34 97	97 85	56 78	44 71
6	65 21	38 39	27 77	76 20	30 86	80 74	22 43	95 68	47 68	37 92
7	65 55	31 26	78 90	90 69	04 66	43 67	02 62	17 69	90 03	12 05
8	05 66	86 90	80 73	02 98	57 46	58 33	27 82	31 45	98 69	29 98
9	39 30	29 97	18 49	75 77	95 19	27 38	77 63	73 47	26 29	16 12
10	64 59	23 22	54 45	87 92	94 31	38 32	00 59	81 18	06 78	71 37
11	07 51	34 87	92 47	31 48	36 60	68 90	70 53	36 82	57 99	15 82
12	86 59	36 85	01 56	63 89	98 00	82 83	93 51	48 56	54 10	72 32
13	83 73	52 25	99 97	97 78	12 48	36 83	89 95	60 32	41 06	76 14
14	08 59	52 18	26 54	65 50	82 04	87 99	01 70	33 56	25 80	53 84
15	41 27	32 71	49 44	29 36	94 58	16 82	86 39	62 15	86 43	54 31
16	00 47	37 59	08 56	23 81	22 42	72 63	17 63	14 47	25 20	63 47
17	86 13	15 37	89 81	38 30	78 68	89 13	29 61	82 07	00 98	64 32
18	33 84	97 83	59 04	40 20	35 86	03 17	68 86	63 08	01 82	25 46
19	61 87	04 16	57 07	46 80	86 12	98 08	39 73	49 20	77 54	50 91
20	43 89	86 59	23 25	07 88	61 29	78 49	19 76	53 91	50 08	07 86
21	29 93	93 91	23 04	54 84	59 85	60 95	20 66	41 28	72 64	64 73
22	38 50	58 55	55 14	38 85	50 77	18 65	79 48	87 67	83 17	08 19
23	31 82	43 84	31 67	12 52	55 11	72 04	41 15	62 53	27 98	22 68
24	91 43	00 37	67 13	56 11	55 97	06 75	09 25	52 02	39 13	87 53
25	38 63	56 89	76 25	49 89	75 26	96 45	80 38	05 04	11 66	35 14

Fourth Thousand

	1–4	5–8	9–12	13–16	17–20	21–24	25–28	29–32	33–36	37–40
1	02 49	05 41	22 27	94 43	93 64	04 23	07 20	74 11	67 95	40 82
2	11 96	73 64	69 60	62 78	37 01	09 25	33 02	08 01	38 53	74 82
3	48 25	68 34	65 49	69 92	40 79	05 40	33 51	54 39	61 30	31 36
4	27 24	67 30	80 21	48 12	35 36	04 88	18 99	77 49	48 49	30 71
5	32 53	27 72	65 72	43 07	07 22	86 52	91 84	57 92	65 71	00 11
6	66 75	79 89	55 92	37 59	34 31	43 20	45 58	25 45	44 36	92 65
7	11 26	63 45	45 76	50 59	77 46	34 66	82 69	99 26	74 29	75 16
8	17 87	23 91	42 45	56 18	01 46	93 13	74 89	24 64	25 75	92 84
9	62 56	13 03	65 03	40 81	47 54	51 79	80 81	33 61	01 09	77 30
10	62 79	63 07	79 35	49 77	05 01	30 10	50 81	33 00	99 79	19 70
11	75 51	02 17	71 04	33 93	36 60	42 75	76 22	23 87	56 54	84 68
12	87 43	90 16	91 63	51 72	65 90	44 43	70 72	17 98	70 63	90 32
13	97 74	20 26	21 10	74 87	88 03	38 33	76 52	26 92	14 95	90 51
14	98 81	10 60	01 21	57 10	28 75	21 82	88 39	12 85	18 86	16 24
15	51 26	40 18	52 64	60 79	25 53	29 00	42 66	95 78	58 36	29 98
16	40 23	99 33	76 10	41 96	86 10	49 12	00 29	41 80	03 59	93 17
17	26 93	65 91	86 51	66 72	76 45	46 32	94 46	81 94	19 06	66 47
18	88 50	21 17	16 98	29 94	09 74	42 39	46 22	00 69	09 48	16 46
19	63 49	93 80	93 25	59 36	19 95	79 86	78 05	69 01	02 33	83 74
20	36 37	98 12	06 03	31 77	87 10	73 82	83 10	83 60	50 94	40 91
21	93 80	12 23	22 47	47 95	70 17	59 33	43 06	47 43	06 12	66 60
22	29 85	68 71	20 56	31 15	00 53	25 36	58 12	65 22	41 40	24 31
23	97 72	08 79	31 88	26 51	30 50	71 01	71 51	77 06	95 79	29 19
24	85 23	70 91	05 74	60 14	63 77	59 93	81 56	47 34	17 79	27 53
25	75 74	67 52	68 31	72 79	57 73	72 36	48 73	24 36	87 90	68 02

RANDOM NUMBERS

Fifth Thousand

	1–4	5–8	9–12	13–16	17–20	21–24	25–28	29–32	33–36	37–40
1	29 93	50 69	71 63	17 55	25 79	10 47	88 93	79 61	42 82	13 63
2	15 11	40 71	26 51	89 07	77 87	75 51	01 31	03 42	94 24	81 11
3	03 87	04 32	25 10	58 98	76 29	22 03	99 41	24 38	12 76	50 22
4	79 39	03 91	88 40	75 64	52 69	65 95	92 06	40 14	28 42	29 60
5	30 03	50 69	15 79	19 65	44 28	64 81	95 23	14 48	72 18	15 94
6	29 03	99 98	61 28	75 97	98 02	68 53	13 91	98 38	13 72	43 73
7	78 19	60 81	08 24	10 74	97 77	09 59	94 35	69 84	82 09	49 56
8	15 84	78 54	93 91	44 29	13 51	80 13	07 37	52 21	53 91	09 86
9	36 61	46 22	48 49	19 49	72 09	92 58	79 20	53 41	02 18	00 64
10	40 54	95 48	84 91	46 54	38 62	35 54	14 44	66 88	89 47	41 80
11	40 87	80 89	97 14	28 60	99 82	90 30	87 80	07 51	58 71	66 58
12	10 22	94 92	82 41	17 33	14 68	59 45	51 87	56 08	90 80	66 60
13	15 91	87 67	87 30	62 42	59 28	44 12	42 50	88 31	13 77	16 14
14	13 40	31 87	96 49	90 99	44 04	64 97	94 14	62 18	15 59	83 35
15	66 52	39 45	96 74	90 89	02 71	10 00	99 86	48 17	64 06	89 09
16	91 66	53 64	69 68	34 31	78 70	25 97	50 46	62 21	27 25	06 20
17	67 41	58 75	15 08	20 77	37 29	73 20	15 75	93 96	91 76	96 99
18	76 52	79 69	96 23	72 43	34 48	63 39	23 23	94 60	88 79	06 17
19	19 81	54 77	89 74	34 81	71 47	10 95	43 43	55 81	19 45	44 07
20	25 59	25 35	87 76	38 47	25 75	84 34	76 89	18 05	73 95	72 22
21	55 90	24 55	39 63	64 63	16 09	95 99	98 28	87 40	66 66	66 92
22	02 47	05 83	76 79	79 42	24 82	42 42	39 61	62 47	49 11	72 64
23	18 63	05 32	63 13	31 99	76 19	35 85	91 23	50 14	63 28	86 59
24	89 67	33 82	30 16	06 39	20 07	59 50	33 84	02 76	45 03	33 33
25	62 98	66 73	64 06	59 51	74 27	84 62	31 45	65 82	86 05	73 00

Sixth Thousand

	1–4	5–8	9–12	13–16	17–20	21–24	25–28	29–32	33–36	37–40
1	27 50	13 05	46 34	63 85	87 60	35 55	05 67	88 15	47 00	50 92
2	02 31	57 57	62 98	41 09	66 01	69 88	92 83	35 70	76 59	02 58
3	37 43	12 83	66 39	77 33	63 26	53 99	48 65	23 06	94 29	53 04
4	83 56	65 54	19 33	35 42	92 12	37 14	70 75	18 58	98 57	12 52
5	06 81	56 27	49 32	12 42	92 42	05 96	82 94	70 25	45 49	18 16
6	39 15	03 60	15 56	73 16	48 74	50 27	43 42	58 36	73 16	39 90
7	84 45	71 93	10 27	15 83	84 20	57 42	41 28	42 06	15 90	70 47
8	82 47	05 77	06 89	47 13	92 85	60 12	32 89	25 22	42 38	87 37
9	98 04	06 70	24 21	69 02	65 42	55 33	11 95	72 35	73 23	57 26
10	18 33	49 04	14 33	48 50	15 64	58 26	14 91	46 02	72 13	48 62
11	33 92	19 93	38 27	43 40	27 72	79 74	86 57	41 83	58 71	56 99
12	48 66	74 30	44 81	06 80	29 09	50 31	69 61	24 64	28 89	97 79
13	85 85	07 54	21 50	31 80	10 19	56 65	82 52	26 58	55 12	26 34
14	08 27	08 08	35 87	96 57	33 12	01 77	52 76	09 89	71 12	17 69
15	59 61	22 14	26 09	96 75	17 94	51 08	41 91	45 94	80 48	59 92
16	17 45	77 79	31 66	36 54	92 85	65 60	53 98	63 50	11 20	96 63
17	11 26	37 08	07 71	95 95	39 75	92 48	99 78	23 33	19 56	06 67
18	48 08	13 98	16 52	41 15	73 96	32 55	03 12	38 30	88 77	17 03
19	76 27	72 22	99 61	72 15	00 25	21 54	47 79	18 41	58 50	57 66
20	98 89	22 25	72 92	53 55	07 98	66 71	53 29	61 71	56 96	41 78
21	88 69	61 63	01 67	61 88	58 79	35 65	08 45	63 38	69 86	79 47
22	12 58	13 75	80 98	01 35	91 16	18 36	90 54	99 17	68 36	85 06
23	08 86	96 36	14 09	43 85	51 20	65 18	06 40	52 17	48 10	68 97
24	33 81	05 51	32 48	60 12	32 44	08 12	89 00	98 82	79 17	97 22
25	05 15	99 28	87 15	07 08	66 92	53 81	69 42	02 27	65 33	57 69

Seventh Thousand

	1–4	*5–8*	*9–12*	*13–16*	*17–20*	*21–24*	*25–28*	*29–32*	*33–36*	*37–40*
1	80 30	23 64	67 96	21 33	36 90	03 91	69 33	90 13	34 48	02 19
2	61 29	89 61	32 08	12 62	26 08	42 00	31 73	31 30	30 61	34 11
3	23 33	61 01	02 21	11 81	51 32	36 10	23 74	50 31	90 11	73 52
4	94 21	32 92	93 50	72 67	23 20	74 59	30 30	48 66	75 32	27 97
5	87 61	92 69	01 60	28 79	74 76	86 06	39 29	73 85	03 27	50 57
6	37 56	19 18	03 42	86 03	85 74	44 81	86 45	71 16	13 52	35 56
7	64 86	66 31	55 04	88 40	10 30	84 38	06 13	58 83	62 04	63 52
8	22 69	58 45	49 23	09 81	98 84	05 04	75 99	27 70	72 79	32 19
9	23 22	14 22	64 90	10 26	74 23	53 91	27 73	78 19	92 43	68 10
10	42 38	59 64	72 96	46 57	89 67	22 81	94 56	69 84	18 31	06 39
11	17 18	01 34	10 98	37 48	93 86	88 59	69 53	78 86	37 26	85 48
12	39 45	69 53	94 89	58 97	29 33	29 19	50 94	80 57	31 99	38 91
13	43 18	11 42	56 19	48 44	45 02	84 29	01 78	65 77	76 84	88 85
14	59 44	06 45	68 55	16 65	66 13	38 00	95 76	50 67	67 65	18 83
15	01 50	34 32	38 00	37 57	47 82	66 59	19 50	87 14	35 59	79 47
16	79 14	60 35	47 95	90 71	31 03	85 37	38 70	34 16	64 55	66 49
17	01 56	63 68	80 26	14 97	23 88	59 22	82 39	70 83	48 34	46 48
18	25 76	18 71	29 25	15 51	92 96	01 01	28 18	03 35	11 10	27 84
19	23 52	10 83	45 06	49 85	35 45	84 08	81 13	52 57	21 23	67 02
20	91 64	08 64	25 74	16 10	97 31	10 27	24 48	89 06	42 81	29 10
21	80 86	07 27	26 70	08 65	85 20	31 23	28 99	39 63	32 03	71 91
22	31 71	37 60	95 60	94 95	54 45	27 97	03 67	30 54	86 04	12 41
23	05 83	50 36	09 04	39 15	66 55	80 36	39 71	24 10	62 22	21 53
24	98 70	02 90	30 63	62 59	26 04	97 20	00 91	28 80	40 23	09 91
25	82 79	35 45	64 53	93 24	86 55	48 72	18 57	05 79	20 09	31 46

Eighth Thousand

	1–4	*5–8*	*9–12*	*13–16*	*17–20*	*21–24*	*25–28*	*29–32*	*33–36*	*37–40*
1	37 52	49 55	40 65	27 61	08 59	91 23	26 18	95 04	98 20	99 52
2	48 16	69 65	69 02	08 83	08 83	68 37	00 96	13 59	12 16	17 93
3	50 43	06 59	56 53	30 61	40 21	29 06	49 60	90 38	21 43	19 25
4	89 31	62 79	45 73	71 72	77 11	28 80	72 35	75 77	24 72	98 43
5	63 29	90 61	86 39	07 38	38 85	77 06	10 23	30 84	07 95	30 76
6	71 68	93 94	08 72	36 27	85 89	40 59	83 37	93 85	73 97	84 05
7	05 06	96 63	58 24	05 95	56 64	77 53	85 64	15 95	93 91	59 03
8	03 35	58 95	46 44	25 70	31 66	01 05	44 44	62 91	36 31	45 04
9	13 04	57 67	74 77	53 35	93 51	82 83	27 38	63 16	04 48	75 23
10	49 96	43 94	56 04	02 79	55 78	01 44	75 26	85 54	01 81	32 82
11	24 36	24 08	44 77	57 07	54 41	04 56	09 44	30 58	25 45	37 56
12	55 19	97 20	01 11	47 45	79 79	06 72	12 81	86 97	54 09	06 53
13	02 28	54 60	28 35	32 94	36 74	51 63	96 90	04 13	30 43	10 14
14	90 50	13 78	22 20	37 56	97 95	49 95	91 15	52 73	12 93	78 94
15	33 71	32 43	29 58	47 38	39 96	67 51	64 47	49 91	64 58	93 07
16	70 58	28 49	54 32	97 70	27 81	64 69	71 52	02 56	61 37	04 58
17	09 68	96 10	57 78	85 00	89 81	98 30	19 40	76 28	62 99	99 83
18	19 36	60 85	35 04	12 87	83 88	66 54	32 00	30 20	05 30	42 63
19	04 75	44 49	64 26	51 46	80 50	53 91	00 55	67 36	68 66	08 29
20	79 83	32 39	46 77	56 83	42 21	60 03	14 47	07 01	66 85	49 22
21	80 99	42 43	08 58	54 41	98 05	54 39	34 42	97 47	38 35	59 40
22	48 83	64 99	86 94	48 78	79 20	62 23	56 45	92 65	56 36	83 02
23	28 45	35 85	22 20	13 01	73 96	70 05	84 50	68 59	96 58	16 63
24	52 07	63 15	82 30	66 23	14 26	66 61	17 80	41 97	40 27	24 80
25	39 14	52 18	35 87	48 55	48 81	03 11	26 99	03 80	08 86	50 42

TABLE 24. TABLE OF NATURAL TRIGONOMETRIC FUNCTIONS

x	sin *x*	cos *x*	tan *x*	cot *x*	
0° 0'	.0000	1.0000	.0000	oo	90° 0'
10'	.0029	1.0000	.0029	343.774	50'
20'	.0058	1.0000	.0058	171.885	40'
30'	.0087	1.0000	.0087	114.589	30'
40'	.0116	.9999	.0116	85.9398	20'
50'	.0145	.9999	.0145	68.7501	10'
1° 0'	.0175	.9998	.0175	57.2900	89° 0'
10'	.0204	.9998	.0204	49.1039	50'
20'	.0233	.9997	.0233	42.9641	40'
30'	.0262	.9997	.0262	38.1885	30'
40'	.0291	.9996	.0291	34.3678	20'
50'	.0320	.9995	.0320	31.2416	10'
2° 0'	.0349	.9994	.0349	28.6363	88° 0'
10'	.0378	.9993	.0378	26.4316	50'
20'	.0407	.9992	.0407	24.5418	40'
30'	.0436	.9990	.0437	22.9038	30'
40'	.0465	.9989	.0466	21.4704	20'
50'	.0494	.9988	.0495	20.2056	10'
3° 0'	.0523	.9986	.0524	19.0811	87° 0'
10'	.0552	.9985	.0553	18.0750	50'
20'	.0581	.9983	.0582	17.1693	40'
30'	.0610	.9981	.0612	16.3499	30'
40'	.0640	.9980	.0641	15.6048	20'
50'	.0669	.9978	.0670	14.9244	10'
4° 0'	.0698	.9976	.0699	14.3007	86° 0'
10'	.0727	.9974	.0729	13.7267	50'
20'	.0756	.9971	.0758	13.1969	40'
30'	.0785	.9969	.0787	12.7062	30'
40'	.0814	.9967	.0816	12.2505	20'
50'	.0843	.9964	.0846	11.8262	10'
5° 0'	.0872	.9962	.0875	11.4301	85° 0'
10'	.0901	.9959	.0904	11.0594	50'
20'	.0929	.9957	.0934	10.7119	40'
30'	.0958	.9954	.0963	10.3854	30'
40'	.0987	.9951	.0992	10.0780	20'
50'	.1016	.9948	.1022	9.7882	10'
6° 0'	.1045	.9945	.1051	9.5144	84° 0'
10'	.1074	.9942	.1080	9.2553	50'
20'	.1103	.9939	.1110	9.0098	40'
30'	.1132	.9936	.1139	8.7769	30'
40'	.1161	.9932	.1169	8.5555	20'
50'	.1190	.9929	.1198	8.3450	10'
7° 0'	.1219	.9925	.1228	8.1443	83° 0'
10'	.1248	.9922	.1257	7.9530	50'
20'	.1276	.9918	.1287	7.7704	40'
30'	.1305	.9914	.1317	7.5958	30'
	cos *x*	sin *x*	cot *x*	tan *x*	*x*

Source: Abridged from Kaj L. Nielsen, *Logarithmic and Trigonometric Tables* (New York: Barnes & Noble, 1947), pp. 94–116.

TRIGONOMETRIC FUNCTIONS

x		sin *x*	cos *x*	tan *x*	cot *x*		
	30′	.1305	.9914	.1317	7.5958		30′
	40′	.1334	.9911	.1346	7.4287		20′
	50′	.1363	.9907	.1376	7.2687		10′
8°	0′	.1392	.9903	.1405	7.1154	82°	0′
	10′	.1421	.9899	.1435	6.9682		50′
	20′	.1449	.9894	.1465	6.8269		40′
	30′	.1478	.9890	.1495	6.6912		30′
	40′	.1507	.9886	.1524	6.5606		20′
	50′	.1536	.9881	.1554	6.4348		10′
9°	0′	.1564	.9877	.1584	6.3138	81°	0′
	10′	.1593	.9872	.1614	6.1970		50′
	20′	.1622	.9868	.1644	6.0844		40′
	30′	.1650	.9863	.1673	5.9758		30′
	40′	.1679	.9858	.1703	5.8708		20′
	50′	.1708	.9853	.1733	5.7694		10′
10°	0′	.1736	.9848	.1763	5.6713	80°	0′
	10′	.1765	.9843	.1793	5.5764		50′
	20′	.1794	.9838	.1823	5.4845		40′
	30′	.1822	.9833	.1853	5.3955		30′
	40′	.1851	.9827	.1883	5.3093		20′
	50′	.1880	.9822	.1914	5.2257		10′
11°	0′	.1908	.9816	.1944	5.1446	79°	0′
	10′	.1937	.9811	.1974	5.0658		50′
	20′	.1965	.9805	.2004	4.9894		40′
	30′	.1994	.9799	.2035	4.9152		30′
	40′	.2022	.9793	.2065	4.8430		20′
	50′	.2051	.9787	.2095	4.7729		10′
12°	0′	.2079	.9781	.2126	4.7046	78°	0′
	10′	.2108	.9775	.2156	4.6382		50′
	20′	.2136	.9769	.2186	4.5736		40′
	30′	.2164	.9763	.2217	4.5107		30′
	40′	.2193	.9757	.2247	4.4494		20′
	50′	.2221	.9750	.2278	4.3897		10′
13°	0′	.2250	.9744	.2309	4.3315	77°	0′
	10′	.2278	.9737	.2339	4.2747		50′
	20′	.2306	.9730	.2370	4.2193		40′
	30′	.2334	.9724	.2401	4.1653		30′
	40′	.2363	.9717	.2432	4.1126		20′
	50′	.2391	.9710	.2462	4.0611		10′
14°	0′	.2419	.9703	.2493	4.0108	76°	0′
	10′	.2447	.9696	.2524	3.9617		50′
	20′	.2476	.9689	.2555	3.9136		40′
	30′	.2504	.9681	.2586	3.8667		30′
	40′	.2532	.9674	.2617	3.8208		20′
	50′	.2560	.9667	.2648	3.7760		10′
15°	0′	.2588	.9659	.2679	3.7321	75°	0′
		cos *x*	sin *x*	cot *x*	tan *x*	*x*	

TRIGONOMETRIC FUNCTIONS

X	sin *x*	cos *x*	tan *x*	cot *x*	
15° 0′	.2588	.9659	.2679	3.7321	75° 0′
10′	.2616	.9652	.2711	3.6891	50′
20′	.2644	.9644	.2742	3.6470	40′
30′	.2672	.9636	.2773	3.6059	30′
40′	.2700	.9628	.2805	3.5656	20′
50′	.2728	.9621	.2836	3.5261	10′
16° 0′	.2756	.9613	.2867	3.4874	74° 0′
10′	.2784	.9605	.2899	3.4495	50′
20′	.2812	.9596	.2931	3.4124	40′
30′	.2840	.9588	.2962	3.3759	30′
40′	.2868	.9580	.2994	3.3402	20′
50′	.2896	.9572	.3026	3.3052	10′
17° 0′	.2924	.9563	.3057	3.2709	73° 0′
10′	.2952	.9555	.3089	3.2371	50′
20′	.2979	.9546	.3121	3.2041	40′
30′	.3007	.9537	.3153	3.1716	30′
40′	.3035	.9528	.3185	3.1397	20′
50′	.3062	.9520	.3217	3.1084	10′
18° 0′	.3090	.9511	.3249	3.0777	72° 0′
10′	.3118	.9502	.3281	3.0475	50′
20′	.3145	.9492	.3314	3.0178	40′
30′	.3173	.9483	.3346	2.9887	30′
40′	.3201	.9474	.3378	2.9600	20′
50′	.3228	.9465	.3411	2.9319	10′
19° 0′	.3256	.9455	.3443	2.9042	71° 0′
10′	.3283	.9446	.3476	2.8770	50′
20′	.3311	.9436	.3508	2.8502	40′
30′	.3338	.9426	.3541	2.8239	30′
40′	.3365	.9417	.3574	2.7980	20′
50′	.3393	.9407	.3607	2.7725	10′
20° 0′	.3420	.9397	.3640	2.7475	70° 0′
10′	.3448	.9387	.3673	2.7228	50′
20′	.3475	.9377	.3706	2.6985	40′
30′	.3502	.9367	.3739	2.6746	30′
40′	.3529	.9356	.3772	2.6511	20′
50′	.3557	.9346	.3805	2.6279	10′
21° 0′	.3584	.9336	.3839	2.6051	69° 0′
10′	.3611	.9325	.3872	2.5826	50′
20′	.3638	.9315	.3906	2.5605	40′
30′	.3665	.9304	.3939	2.5386	30′
40′	.3692	.9293	.3973	2.5172	20′
50′	.3719	.9283	.4006	2.4960	10′
22° 0′	.3746	.9272	.4040	2.4751	68° 0′
10′	.3773	.9261	.4074	2.4545	50′
20′	.3800	.9250	.4108	2.4342	40′
30′	.3827	.9239	.4142	2.4142	30′
	cos *x*	sin *x*	cot *x*	tan *x*	*x*

TRIGONOMETRIC FUNCTIONS

x		sin x	cos x	tan x	cot x		
	30′	.3827	.9239	.4142	2.4142		30′
	40′	.3854	.9228	.4176	2.3945		20′
	50′	.3881	.9216	.4210	2.3750		10′
23°	0′	.3907	.9205	.4245	2.3559	67°	0′
	10′	.3934	.9194	.4279	2.3369		50′
	20′	.3961	.9182	.4314	2.3183		40′
	30′	.3987	.9171	.4348	2.2998		30′
	40′	.4014	.9159	.4383	2.2817		20′
	50′	.4041	.9147	.4417	2.2637		10′
24°	0′	.4067	.9135	.4452	2.2460	66°	0′
	10′	.4094	.9124	.4487	2.2286		50′
	20′	.4120	.9112	.4522	2.2113		40′
	30′	.4147	.9100	.4557	2.1943		30′
	40′	.4173	.9088	.4592	2.1775		20′
	50′	.4200	.9075	.4628	2.1609		10′
25°	0′	.4226	.9063	.4663	2.1445	65°	0′
	10′	.4253	.9051	.4699	2.1283		50′
	20′	.4279	.9038	.4734	2.1123		40′
	30′	.4305	.9026	.4770	2.0965		30′
	40′	.4331	.9013	.4806	2.0809		20′
	50′	.4358	.9001	.4841	2.0655		10′
26°	0′	.4384	.8988	.4877	2.0503	64°	0′
	10′	.4410	.8975	.4913	2.0353		50′
	20′	.4436	.8962	.4950	2.0204		40′
	30′	.4462	.8949	.4986	2.0057		30′
	40′	.4488	.8936	.5022	1.9912		20′
	50′	.4514	.8923	.5059	1.9768		10′
27°	0′	.4540	.8910	.5095	1.9626	63°	0′
	10′	.4566	.8897	.5132	1.9486		50′
	20′	.4592	.8884	.5169	1.9347		40′
	30′	.4617	.8870	.5206	1.9210		30′
	40′	.4643	.8857	.5243	1.9074		20′
	50′	.4669	.8843	.5280	1.8940		10′
28°	0′	.4695	.8829	.5317	1.8807	62°	0′
	10′	.4720	.8816	.5354	1.8676		50′
	20′	.4746	.8802	.5392	1.8546		40′
	30′	.4772	.8788	.5430	1.8418		30′
	40′	.4797	.8774	.5467	1.8291		20′
	50′	.4823	.8760	.5505	1.8165		10′
29°	0′	.4848	.8746	.5543	1.8040	61°	0′
	10′	.4874	.8732	.5581	1.7917		50′
	20′	.4899	.8718	.5619	1.7796		40′
	30′	.4924	.8704	.5658	1.7675		30′
	40′	.4950	.8689	.5696	1.7556		20′
	50′	.4975	.8675	.5735	1.7437		10′
30°	0′	.5000	.8660	.5774	1.7321	60°	0′
		cos x	sin x	cot x	tan x	x	

TRIGONOMETRIC FUNCTIONS

x		sin x	cos x	tan x	cot x		
30°	0′	.5000	.8660	.5774	1.7321	60°	0′
	10′	.5025	.8646	.5812	1.7205		50′
	20′	.5050	.8631	.5851	1.7090		40′
	30′	.5075	.8616	.5890	1.6977		30′
	40′	.5100	.8601	.5930	1.6864		20′
	50′	.5125	.8587	.5969	1.6753		10′
31°	0′	.5150	.8572	.6009	1.6643	59°	0′
	10′	.5175	.8557	.6048	1.6534		50′
	20′	.5200	.8542	.6088	1.6426		40′
	30′	.5225	.8526	.6128	1.6319		30′
	40′	.5250	.8511	.6168	1.6212		20′
	50′	.5275	.8496	.6208	1.6107		10′
32°	0′	.5299	.8480	.6249	1.6003	58°	0′
	10′	.5324	.8465	.6289	1.5900		50′
	20′	.5348	.8450	.6330	1.5798		40′
	30′	.5373	.8434	.6371	1.5697		30′
	40′	.5398	.8418	.6412	1.5597		20′
	50′	.5422	.8403	.6453	1.5497		10′
33°	0′	.5446	.8387	.6494	1.5399	57°	0′
	10′	.5471	.8371	.6536	1.5301		50′
	20′	.5495	.8355	.6577	1.5204		40′
	30′	.5519	.8339	.6619	1.5108		30′
	40′	.5544	.8323	.6661	1.5013		20′
	50′	.5568	.8307	.6703	1.4919		10′
34°	0′	.5592	.8290	.6745	1.4826	56°	0′
	10′	.5616	.8274	.6787	1.4733		50′
	20′	.5640	.8258	.6830	1.4641		40′
	30′	.5664	.8241	.6873	1.4550		30′
	40′	.5688	.8225	.6916	1.4460		20′
	50′	.5712	.8208	.6959	1.4370		10′
35°	0′	.5736	.8192	.7002	1.4281	55°	0′
	10′	.5760	.8175	.7046	1.4193		50′
	20′	.5783	.8158	.7089	1.4106		40′
	30′	.5807	.8141	.7133	1.4019		30′
	40′	.5831	.8124	.7177	1.3934		20′
	50′	.5854	.8107	.7221	1.3848		10′
36°	0′	.5878	.8090	.7265	1.3764	54°	0′
	10′	.5901	.8073	.7310	1.3680		50′
	20′	.5925	.8056	.7355	1.3597		40′
	30′	.5948	.8039	.7400	1.3514		30′
	40′	.5972	.8021	.7445	1.3432		20′
	50′	.5995	.8004	.7490	1.3351		10′
37°	0′	.6018	.7986	.7536	1.3270	53°	0′
	10′	.6041	.7969	.7581	1.3190		50′
	20′	.6065	.7951	.7627	1.3111		40′
	30′	.6088	.7934	.7673	1.3032		30′
		cos x	sin x	cot x	tan x	x	

TRIGONOMETRIC FUNCTIONS

x	sin x	cos x	tan x	cot x	
30′	.6088	.7934	.7673	1.3032	30′
40′	.6111	.7916	.7720	1.2954	20′
50′	.6134	.7898	.7766	1.2876	10′
38° 0′	.6157	.7880	.7813	1.2799	52° 0′
10′	.6180	.7862	.7860	1.2723	50′
20′	.6202	.7844	.7907	1.2647	40′
30′	.6225	.7826	.7954	1.2572	30′
40′	.6248	.7808	.8002	1.2497	20′
50′	.6271	.7790	.8050	1.2423	10′
39° 0′	.6293	.7771	.8098	1.2349	51° 0′
10′	.6316	.7753	.8146	1.2276	50′
20′	.6338	.7735	.8195	1.2203	40′
30′	.6361	.7716	.8243	1.2131	30′
40′	.6383	.7698	.8292	1.2059	20′
50′	.6406	.7679	.8342	1.1988	10′
40° 0′	.6428	.7660	.8391	1.1918	50° 0′
10′	.6450	.7642	.8441	1.1847	50′
20′	.6472	.7623	.8491	1.1778	40′
30′	.6494	.7604	.8541	1.1708	30′
40′	.6517	.7585	.8591	1.1640	20′
50′	.6539	.7566	.8642	1.1571	10′
41° 0′	.6561	.7547	.8693	1.1504	49° 0′
10′	.6583	.7528	.8744	1.1436	50′
20′	.6604	.7509	.8796	1.1369	40′
30′	.6626	.7490	.8847	1.1303	30′
40′	.6648	.7470	.8899	1.1237	20′
50′	.6670	.7451	.8952	1.1171	10′
42° 0′	.6691	.7431	.9004	1.1106	48° 0′
10′	.6713	.7412	.9057	1.1041	50′
20′	.6734	.7392	.9110	1.0977	40′
30′	.6756	.7373	.9163	1.0913	30′
40′	.6777	.7353	.9217	1.0850	20′
50′	.6799	.7333	.9271	1.0786	10′
43° 0′	.6820	.7314	.9325	1.0724	47° 0′
10′	.6841	.7294	.9380	1.0661	50′
20′	.6862	.7274	.9435	1.0599	40′
30′	.6884	.7254	.9490	1.0538	30′
40′	.6905	.7234	.9545	1.0477	20′
50′	.6926	.7214	.9601	1.0416	10′
44° 0′	.6947	.7193	.9657	1.0355	46° 0′
10′	.6967	.7173	.9713	1.0295	50′
20′	.6988	.7153	.9770	1.0235	40′
30′	.7009	.7133	.9827	1.0176	30′
40′	.7030	.7112	.9884	1.0117	20′
50′	.7050	.7092	.9942	1.0058	10′
45° 0′	.7071	.7071	1.0000	1.0000	45° 0′
	cos x	sin x	cot x	tan x	x

TABLE 25. TABLE OF IMPORTANT CONSTANTS

	Value		
π	3.14159	26535	89793
π^2	9.86960	44010	89359
$\sqrt{\pi}$	1.77245	38509	05516
$\frac{1}{\pi}$	0.31830	98861	83791
$\frac{1}{\sqrt{2\pi}}$	0.39894	22804	01433
$\frac{1}{2\pi}$	0.15915	49430	91895
e	2.71828	18284	59045
e^2	7.38905	60989	30650
$\sqrt{e}$	1.64872	12707	00128
$\frac{1}{e}$	0.36787	94411	71442
$\frac{1}{\sqrt{e}}$	0.60653	06597	12633
$\log_e 10$	2.30258	50929	94046
$\log_{10} e$	0.43429	44819	03252